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THE sudden death at Liverpool, England, on June 4th, of Mr. FURMAN HUNT, President of the Oxford Gold Mining Company, N. S., is announced. Mr. HUNT had been prominently connected, for many years past, with Nova Scotian mining interests, which have lost in his death an able representative.

WILL some of our readers in Colorado who are acquainted with the following properties please give us information concerning them—the Gem, the Glen, and the Granite mine in Colorado? They have appeared in our table of dividend-paying mine, and are said to have paid a small amount each; but correspondents write us in the most unfavorable terms concerning them; and before deciding to strike them from our lists, we desire fuller information.

WE understand that the next meeting of the Institute of Mining Engineers will be held in Nova Scotia, beginning probably at Halifax, on the 15th of September. The authorities, both of the Dominion and of the Province, have shown special interest in the matter, making grants of money and offering free transportation over government railroads, etc.; and it may be confidently expected that the meeting, held under such auspices, will prove exceptionally pleasant and profitable. The Secretary of the Institute will soon issue a preliminary circular on the subject.

THE Brooklyn Elevated Railroad starts off very successfully, carrying already 25,000 passengers a day. Its effect is visible in increased travel over the Bridge and the great diminution of the morning and evening crowds in the horse-cars. The iron-work of this road was manufactured and erected by the New Jersey Steel and Iron Company (COOPER, HEWITT & Co.), at 3·325 cents a pound—the lowest price, we believe, ever obtained for such work in this country, though not quite so low as the figure (3·22) erroneously given for this case by some of our exchanges. As an engineering structure, it is believed to be in some respects superior to the New York elevated roads. *

THE torsion-balance, described by Dr. ALFRED SPRINGER, of Cincinnati, at the meeting of the Institute of Mining Engineers, in February, 1884, was the subject of animated discussion at the recent meeting, of the Mechanical Engineers, at Atlantic City, where Mr. WILLIAM KENT read a paper on the subject. Mr. EMERY and others doubted the extent of superior accuracy and sensitiveness claimed for the torsion-balance; and the question seems to have been left unsettled by the discussion. But the new device has gained a strong friend in Mr. KENT; and he will doubtless not allow the debate to languish for want of further tests and arguments, if such be necessary. *

AMERICANS visiting Europe this summer will have plenty of opportunities to visit "expositions." Our London exchanges furnish the following list: In London, till the end of October, the Inventions Exhibition; in Antwerp, for the same period, an international exhibition; at Pesth, for the same period, a Hungarian exhibition; at Koenigsberg, East Prussia, and at Sheffield, England, industrial exhibitions for about a month in June and July; at the same time, at Delft, Holland, an exhibition of ceramic wares; at Leipsic, early in June, a great fair and machinery market; at Breslau, Silesia, about the same time, the great annual agricultural show; at Nuremberg, Bavaria, from June 15th to September 30th, a display of bronze and silver work, etc.; and at Paris, in July, an industrial exhibition. Tourists who wish to see this sort of thing can use the above list as a guide to their travels; and it will be equally available in showing tourists of more quiet tastes what points to avoid at particular times.

THE exact extent to which the Bower-Barff process can be successfully used, remains to be proved by experience. That it is thoroughly adequate to protect iron surfaces against atmospheric agencies and a large class of weak acids and acid fumes, is abundantly established. Mr. TOWNE, in a discussion at the Atlantic City meeting of Mechanical Engineers, said that it had failed on iron boat-trimmings; that the salt water soon attacked the metal; and that, where the protective coating was worn away, oxidation occurred more rapidly than if the iron had never been treated by this process. Concerning the last statement, we have no knowledge upon which we could speak with authority; but we can not see any reason in the nature of the case for *increased* oxidation, due to the Bower-Barff treatment. On the other hand, we do know that the magnetic oxide coating deposited by this process resists the action of salt water completely. Mr. TOWNE'S experience, therefore, suggests two remarks: 1. Surfaces subjected to abrasion can not be expected to remain protected by the Bower-Barff coating. That coating will stand better than paint or zinc; but it can, of course, be chipped or ground off; and when it is gone, the protection is gone. 2. Like every other metallurgical process, the Bower-Barff must be practiced with some skill and care. It is quite possible to turn out poor work. And it has been found that, for certain classes of work, some variation in treatment, and particularly a longer duration of the treatment, are highly beneficial. It seems to us quite likely that properly prepared samples would have given better results to Mr. TOWNE, provided he did not put them where the surface would be "worn off." *

Mr. W. W. EVANS, an American civil engineer, is reported to have been appointed on a board of engineers to report upon plans furnished for the construction of a railroad bridge 3000 feet long, across the Hawkesbury River in New South Wales. The engineering difficulties to be overcome in the bridge are great. The foundation for the piers, it is said, will have to be sunk deeper than those of any bridge ever before constructed. Many American engineers have submitted plans.

We see it stated that this is the first instance where an American engi-

neer has received an appointment of this kind; but this, we are happy to say, is very far from being the case. Many of our American civil, mining, and metallurgical engineers, in recent years especially, have been appointed on important foreign government work and government committees.

American engineers are deservedly held in high estimation in every part of the world; for in practical work they have attained better results, with restricted means, than the engineers of any other country.

In bridge-building, American engineers unquestionably lead the world. In gold and silver mining and milling, in lead, silver, copper, mercury, and nickel metallurgy, and in many other branches of engineering, the practical ingenuity and fertility in resources that are the distinguishing characteristics of the American engineer, have produced results unequaled in any other country. For this reason, American metallurgists are working the gold and copper and silver ores in many parts of South America with American plant. Our copper furnaces, under the charge of American engineers, have gone to Australia; our mining engineers have been again and again called upon by the Chinese and Japanese and Indian governments to examine and report upon the mineral resources of their countries. The superiority of the American engineer in the economical solution of practical questions of civil engineering works, or mining and metallurgical questions, is now very generally admitted, and is more and more frequently recognized in foreign countries.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

The Rooks Gold Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Can you give your readers any precise information concerning the Rooks gold mine in Vermont? I see in your dividend table that it pays dividends, and I have tried to get some information about the property; but I am told no one is admitted to the mine, and your suggestion, made some time ago when you reviewed the company's report, that some expert evidence concerning its value is desirable, seems to me to call for some answer. If the property is as claimed, a little more light on it could not be disadvantageous to the company, and it would be appreciated by those who would like to see the enterprise a success and to see it relieved from ill-natured remarks that are now made concerning it. Yours, BOSTON.

Note on the Determination of Phosphorus.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The phosphorus of many of the magnetic iron ores is combined with lime, forming the mineral apatite, which is readily soluble in dilute acids, and the following short method can be used to advantage:

From 1 to 10 grams of the finely ground ore are heated with from 10 to 20 c. c. of dilute (1 : 4) nitric acid, for a few moments; the liquid is filtered from the undecomposed iron ore, and contains all the phosphorus, with a little lime, iron, etc., but is free from silica and titanic acid, and is ready for the precipitation of phosphorus by ammonium molybdate without further preparation.

I have used the above method daily for the last two years with many different samples of magnetic ore, and have found but few that did not give up all their phosphorus to hot dilute nitric acid.

STERLING FURNACE, STERLINGTON, N. Y. E. P. JENNINGS.

Eames's Direct Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your notice of the Eames new direct process for iron-making, though it carefully avoids indorsing the process, yet seems to me to give it undue prominence.

Dr. Eames may be a very skillful metallurgist—he has certainly dabbled in metallurgical questions long enough to be so; but his record, I believe, has been one of at least continuous failure, and this last alleged invention appears to us to be in the same old line. In the first place, I see nothing new in the mixing of carbon with the ore; and in the second place, as you say, though the very purest ores will make a clean sponge, nothing can be done with impure ore except to melt the sponge.

Dr. Eames seems to be following too far behind the art. No one wants iron to-day. Steel is taking its place in almost every thing, and neither Dr. Eames's alleged process nor any other direct process can be of the slightest practical importance. Yours, BLOOM.

Corliss Valve Gearing

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I can quote to your correspondent of May 23d, "H. W. H.," some cases in which hoisting-engines are using the Corliss valve gear in the copper mines of Lake Superior. I should not consider that the cases would differ materially from colliery practice. All the shafts are inclined except the Tamarack; varying from about 20 degrees at the Conglomerate to 53 degrees at the Pewabic. The Conglomerate is down only about 8 lifts, and the Pewabic to 34. The Osceola is at the 16th.

The Pewabic, on Portage Lake, has a Corliss engine made many years ago, which ran the skip until the mine suspended operations last year. The engine gave general satisfaction, and was rebuilt in the same form after passing through a fire that destroyed the engine-house. At the time I last saw it, the cut-off was not used, the steam being controlled at the throttle. As the mine deepened and heavier skips were used, the engine became too small, and as the full cylinder of steam was generally required, the cut-off was abandoned.

The Peninsula Mining Company has in operation a Corliss engine manufactured in Massachusetts, which hoists from two shafts and runs the pump. Neither this nor the engine at the Pewabic is attached directly to the drum, but uses a pinion-shaft and a gear.

The Conglomerate Mining Company, in Keweenaw County, has on its location a very fine hoisting plant, the cylinders of which were made by Watts, Campbell & Co., of Newark, New Jersey, the drums by the Webster, Camp & Lane Machine Company, of Akron, Ohio.

The machinery consists of two 24 by 48 Corliss engines, which are connected with a pinion-shaft. This shaft carries two pinions 4 feet in diameter, each one of which meshes with two 14½-foot gears. These gears are attached to four 14-foot drums by means of the Lane band friction. The engines make 50 revolutions a minute, with a boiler pressure of 65 pounds. The speed of hoisting is 600 feet a minute, and the skips are lowered at the rate of 2200 feet a minute.

The Osceola Consolidated Mining Company, of Opechee, Houghton County, Mich., has just had erected at its No. 3 shaft an excellent hoisting-engine of the Reynolds-Corliss type of cylinder, made by E. P. Allis & Co., of Milwaukee, Wis. This engine is the only direct-acting Corliss engine on the lake, and itself and the Tamarack engine, which has plain slide-valves, comprise the only two engines on the lake in which the main shaft is the drum-shaft. It consists of two Reynolds-Corliss 20 by 50 cylinders, which are attached by disk-cranks to the shaft. There are two drums, which can be operated singly or together. The engine reverses by steam, and each drum is provided with a brake, as is also the main shaft. The shoes for the main shaft brake bear upon the disk-cranks. The cut-off is not automatic, as in the case of the other engines mentioned, but is controlled by a separate lever. The engine has only been very recently set up, but does the best of work. It hoists at the rate of 1500 per minute. At present, only one drum is used. The skips weigh 3500 pounds, the usual load 3000 pounds, and this has been hoisted from the sixteenth level up to the dump, the skip discharged and started on the way back in sixty seconds. From the sixteenth level to the brace, is about 1460. With steam at 75 pounds, the engine runs very easily, cutting off at one third stroke, no condenser being used as yet, and hoisting one skip. During an eight-hour shift, 120 skips have been hoisted. J. PARKE CHANNING.

HOUGHTON, L. S., MICH., June 8.

KANAWHA COAL SHIPMENTS.

The report of the Chief of Engineers of the United States Army for 1884, says the Pittsburg *American Manufacturer*, shows that 30,480,256 bushels of coal were shipped by rail and river, from Great Kanawha mines, below Kanawha Falls, during the year ended June 30th, 1884. The railroads carried 12,059,172 bushels, and the river 18,421,084 bushels. The following table gives the names of the companies and the number of bushels shipped by each:

Name of operators.	Year ended June 1st, 1884. By rail.	By river.	Total.
Bennington Colliery	*	*	*
Black Band Iron and Coal Company	102,240	309,848	412,088
Buck, Stuart M. (included below)	.....	.....	.....
Campbell Creek Coal Company	.....	4,131,711	4,131,711
Cannelton Coal Company	*	*	*
Carver Brothers	980,000	.....	980,000
Cedar Grove Mining Company	.....	183,000	183,000
Coal Valley Coal Company	698,861	.....	698,861
Crescent Mines	1,746,102	.....	1,746,102
Crown Hill Splint Coal Company	401,932	650,000	1,051,932
Dana Brothers	.....	1,751,439	1,751,439
Davis, M. T. & Co	977,840	.....	977,840
Eagle Coal and Coke-Works	1,569,700	.....	1,569,700
Faulkner, F	785,344	5,040	790,384
Great Kanawha Colliery Company	180,878	.....	180,878
Henson & Talley	.....	.....	.....
Kanawha Cannel Coal Company	145,544	346,600	492,144
Kanawha Mining Company	650,137	1,279,256	1,929,392
Logan Coal and Salt Company	.....	.....	.....
Macfarlane Coal Company	.....	714,000	714,000
Marmet Mining Company	.....	1,853,416	1,853,416
Mount Morris Coal Company	773,612	.....	773,612
Oak Ridge Coal Company	.....	.....	.....
Peabody Coal Company	.....	1,500,000	1,500,000
Pioneer Coal Company	.....	1,730,864	1,730,864
Reynolds & Sturdevant	35,280	8,316	43,596
Robinson Coal Company	865,592	909,501	1,775,093
Saint Claire Company	448,200	.....	448,200
Stevens Coal and Coke Company	28,000	.....	28,000
Straughan, George (Coal Valley)	139,724	.....	139,724
Straughan, George (North Coaling)	.....	.....	.....
Winifrede Coal Company	264,426	2,337,190	2,563,616
Wyoming Manufacturing Company	.....	.....	.....
Other parties	1,303,760	711,903	2,015,663
Total bushels	12,059,172	18,421,084	30,480,256

The table appended shows the total amount shipped during each of the last three years, expressed in tons of 2000 pounds:

	By rail.	By river.	Total.
1880-81	265,266	385,148	650,414
1882-83	531,610	614 818	1,146,428
1883-84	482,367	736,843	1,219,210
Totals	1,279,243	1,736,809	3,016,052

The figures above, when compared, show what an impetus has been given by the system of dams and locks to the shipments by water.

Immense Floating Dome.—The dome presented by M. Bischoffsheim to the Observatory at Nice is now finished, and has recently been on exhibition in Paris. It is intended to cover a colossal telescope; it is 22 m. in diameter inside, and has a circumference of 60 m., or 2 m. more than the dome of the Pantheon. Instead of rendering it movable by placing it on rollers, according to the ordinary method, it is closed below by a reservoir for air, which rests on the water in a circular basin. This system of suspension is said to be so perfect that, in spite of its great weight, a single person can turn it completely around the horizon. To provide against the water freezing, it has been proposed to dissolve it in a salt to the point of saturation, but it is feared that this may cause corrosion of the apparatus. Frosts, however, are rare in Nice, and special experiments on this subject will be made.

* Included below in other parties.

THE WISWELL ORE PULVERIZER AND ELECTRIC AMALGAMATOR.

This machine, of which the accompanying illustration shows the construction, is one of the most simple of ore pulverizers. It consists of four heavy chasing rollers running in a pan. Any degree of fineness for the ore can be kept in the pan as long as desired. As a simple amalgamator, it should give the excellent results obtained in an arrastra, but the work of crushing is greatly lessened. The apparatus is so simple that it needs no further description. The claims made for it are :

That its first cost is less than that of stamps to do the same work.

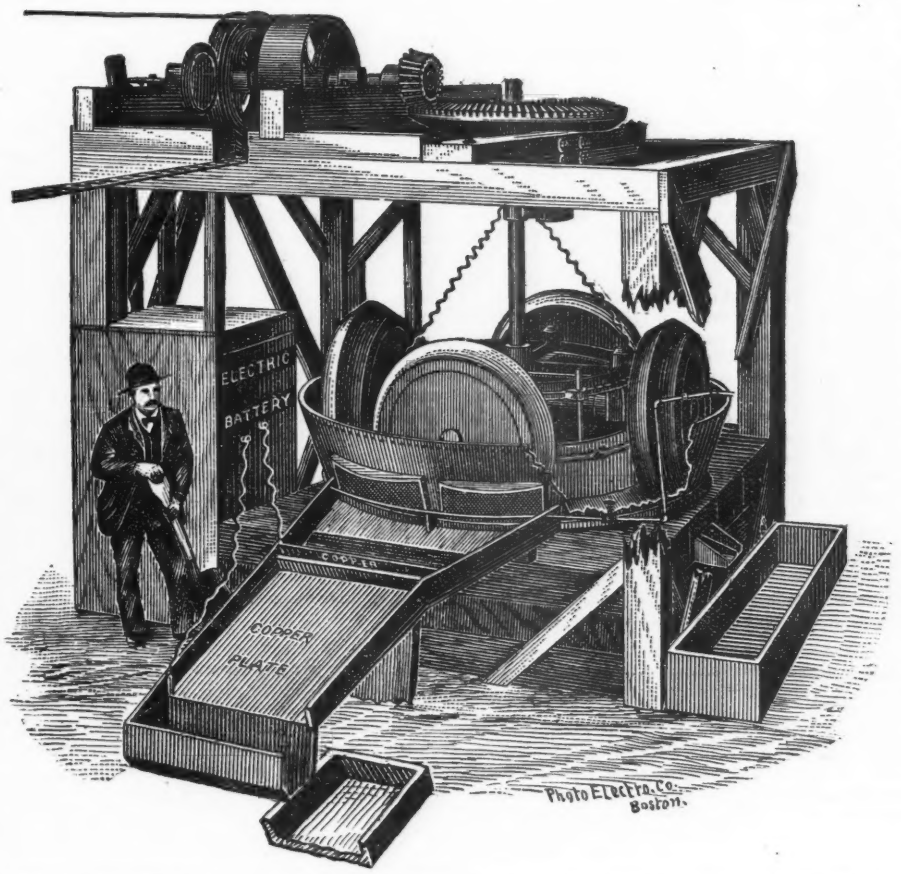
That it requires less power to run it.

The wear and tear is but a small part of that of stamps.

That it grinds to a uniform fineness, that it does not flour the mercury, and that the pan can be cleaned up in a few minutes and without stopping the mill.

The manufacturers also claim that a current of electricity passed through the machine while in operation tends to keep the mercury clean and gives higher results than can be obtained without it ; but the machine can be run either with or without the electric current, which can be turned on or off as may be desired. It is said to have a capacity of one ton an hour.

Tests made in the sample mill of the manufacturers are stated to have demonstrated all the claims made for this machine, and as a number have been ordered and are put to work in different parts of the country, the full working returns can now be obtained by addressing the manufacturers, No. 4 Post-Office Square, Boston. The great simplicity of the machine and its evident durability commend it to those having ores and tailings to which it is specially adapted.



THE WISWELL ORE PULVERIZER AND ELECTRIC AMALGAMATOR.

New System of Projectiles.—Patents were issued June 9th for a new system for the production of spherical and conical projectiles, which was confidentially laid before the Army and Navy Ordnance departments some time ago, and deemed of such importance to the government service that the Secretary of War and the Secretary of the Navy made official requests to have the applications for the patents given special attention and advanced for immediate action. It is understood that, by means of the new process, the invention of G. F. Simonds, of Fitchburg, Mass., projectiles of any shape or caliber of even the hardest steel are made and condensed with wonderful rapidity directly from the heated bar and at one operation, and of such precise dimensions as to be ready for use without further treatment. By the present mode of manufacture, all armor-piercing projectiles, after being forged, are brought to shape and size by the slow and expensive process of turning in a lathe.

Ancient Telephony among the Chinese.—The following communication was recently made to a meeting of the Royal Asiatic Society in Shanghai : "It detracts nothing from the merit of the ingenious physicists who have conferred on mankind the boon of the telephone that its principles are familiar to uncivilized peoples, several of whom are in possession of rudimentary telephones. It was, I opine, when the Chinese were in their youth that they constructed the rudimentary instrument a specimen of which I herewith transmit for the society's museum. It consists of two bamboo cylinders, from one and a half to two inches in diameter, and four in length ; one end of each is closed by a tympanum of pig bladder, which is perforated for the transmitting string, the string kept in place by being knotted. This rude instrument is styled the 'listening tube,' and is employed for amusement as a toy, conveying whispers forty or fifty feet. It is unknown in many parts of the empire, Chih-kiang and Kiangsu being the only provinces (so far as I can ascertain) where the listening-tube is employed. Besides this toy, Chinese ingenuity produced about a century and a half ago the 'thousand-mile speaker.' The implement is described as 'a roll of copper, likened to a fife, containing an artful device ; whispered into and immediately closed, the confined message, however long, may be conveyed to any distance ; and thus in a battle secret instructions may be conveniently communicated. It is a contrivance of extraordinary merit.' The inventor of the 'thousand-mile speaker,' Chiang Shun-hsin, of Huichoo, flourished during the reign of Kang-hsi, seventeenth century. He wrote on occult science, astronomy, etc. The above account of this invention was taken from his works by the author of a Fuhkien miscellany. At that time—reign of Kien Lung—there was no longer an instrument of this description in that province."

THE CLAPP AND GRIFFITHS PROCESS.*†

By Robert W. Hunt, Troy, N. Y.

Having devoted considerable time to the investigation of the Clapp-Griffiths converter, and the metal produced in it, it may perhaps be of interest to the Institute to learn the conclusions which I have formed. Of course, it is well known that the stationary converter of small size is the very oldest type of vessel used in the pneumatic process. Hence, it will be only necessary to call your attention to the points which are special features of the Clapp-Griffiths. This converter has a slag tap-hole situated at such a hight in relation to the metal under treatment that, when the cinder is formed and boils up as the blow progresses, it can run off, and thus be removed from contact with the iron, and will also be out of the way when the decarbonized metal is tapped into the casting-ladle and the manganiferous alloy added. The manner of shutting off the blast, when the process is completed and the metal is being tapped is another distinctive feature. The tuyeres are situated around the sides of the vessel, and enter the interior some little distance above the bottom ; they are provided with plugs through the centers of which there are small openings. When the blow is completed, these plugs are forced forward into the outer orifices of the tuyeres, thus shutting off the blast, excepting the small quantity entering through the passages named. While this is sufficient to keep the metal from running into the tuyeres, it reduces to the minimum the action of the blast while the metal is being tapped. Of course, this is of great importance, as in an ordinary stationary converter any delay in getting open the tap-hole means overblowing, and even while the first part of the charge is running out, the oxidation is in full force. Duplicate or movable bottoms are used, thus more than doubling the possible output of the plant. The pressure of blast is quite light, never exceeding 8 pounds, and usually only 5 pounds are used. To the Bessemer engineer, accustomed to large converters and great output, a plant of converters having a capacity of some 4000 pounds at each heat seems like a plaything, and one with which it would be impossible to compete against the larger plants. Certainly such were my first impressions ; but I can assure you the matter will bear investigation. In the first place, a complete plant of two vessels can at the present time be constructed for not over $55,000, including all buildings ; and I am satisfied that 80 gross tons of ingots per twenty-four hours can be made in it with the greatest ease, and no doubt this output could be brought up to 100 gross tons. The strain upon all the parts of the plant being so light, the item of repairs is very low, and the general operating expenses are small. I therefore believe the Clapp-Griffiths converter will be found desirable for existing works whose products in the past have been exclusively wrought-iron. By a comparatively small outlay, they can meet the growing demand for steel, and thus give the world its advanced material without rendering idle and useless many thousands of capital. We have so often doomed the puddling-furnace, in spite of which it has continued in full life, that I will not again announce its death-knell, but will say that the possibilities of the Clapp-Griffiths do not seem to favor its continued vigor. In estimating the cost of producing soft steel ingots in a properly arranged Clapp-Griffiths plant, my figures are as follows :

Iron	$17.00	Refractories	.20
Fifteen per cent loss	2.55	Molds	.15
Labor	1.50	Expenses and repairs	.50
Coal	.57		
Ferro-manganese	.63	Total	$23.10

This is for metal made from an ordinary Bessemer iron ; but if, as I will show later, for many purposes a cheaper iron can be used, my figures would be :

Iron	$16.00	Other items	$3.55
Fifteen per cent loss	2.47		
Total			$21.95

Either of these figures is certainly under the cost of muck-bar in the most favored localities ; but it may be said that we have in the one case ingots which have to be broken down, and in the other

* A paper read at the New York Meeting of the American Institute of Mining Engineers, February, 1885.

† The diagrams appended to the present paper, and the discussion that follows, belong equally to the paper of Mr. Witherow on the same subject, read on the same occasion.

bars which may be piled and rolled directly. I think this account will fully balance itself in this way: for all large sizes of iron made from puddled bar, you must have a reworked top and bottom; and for very small ones, billets, while by using proper sized and shaped ingots, and careful work in the steel-pit, they can be rolled directly into many things. It is in this respect that the small plant differs from the large one. With a product of from 400 to 500 tons a day, it is impossible to submit to the delay incident to casting small ingots. With the smaller product, but still one which is up to the maximum of economy of the plant, no delay is caused. The next thing to be considered after the cost of making the product in the Clapp-Griffiths converter is the quality of the metal produced. In the Clapp-Griffiths plant of Messrs. Oliver Brothers & Phillips, many hundreds of tons of this metal have been made and placed on the market in different forms, such as tacks, rivets, wire rods, telegraph-wire, lightning-rods, horseshoe nails, pipe-strips, plates, sheets, bars, angles, shovels, spades, and stamping-iron, and, so far as I have been able to ascertain, great satisfaction has been obtained in its use for these various purposes. In fact, large quantities have been used in the place of imported Swedish bars with success, and the workmen manipulating it were none the wiser. When first starting the works, the best brands of English Bessemer irons were used, and the steel produced was of a most satisfactory quality. But I am assured that this grade of pig was continued for a very short time. Indeed, I am under the impression that altogether less than 100 tons of this iron was ever purchased for the works. The metal produced so far exceeded all requirements that the use of iron of a lower standard was ventured upon, hundreds of tons of ingots being made from pig carrying from ·09 to ·14 of phosphorus. The metal possessed an ever-constant welding property, with great toughness. My attention having been called to the process by Mr. James P. Witherow, who had witnessed its working in England, and had, with Mr. Henry W. Oliver, Jr., secured the control of the patents in this country, Mr. Oliver kindly gave me every facility to investigate what they were doing, as well as putting the works at my disposal to try any experiments I might desire. Being anxious to determine to what extent the use of high phosphorus iron was possible, I first had a mixture tried which gave a metal with about ·34 per cent of that element. To my surprise, this worked so well that I ventured farther and doubled my proportion of high phosphorus pig, obtaining a steel with ·54 per cent of phosphorus, and my surprise certainly did not decrease when I saw the test-piece bend double, cold, and the metal work beautifully when hot. Thinking these results might be instances of those accidents which sometimes defy explanation, I had the experiments repeated, with like results, and since then many tons of this high phosphorus metal have been made and used for various purposes. Some of the ingots were rolled into slabs and sent to the works of the Albany & Rensselaer Iron and Steel Company, at Troy, where they were rolled into nail-plate and cut into nails at the factory of that company. These samples that I have before me are some of them, and I think no one can question their quality being all that could be desired. In fact, they possess a stiffness which is valuable, while their ability to stand torsion speaks for itself.

This partly finished shovel was also made from Clapp-Griffiths metal. As you see, the metal has been turned over, a perfect weld made, and the strap cut in two. The lower end was quenched in water and turned over cold without producing more of a flaw than you see. Mr. J. M. Sherrerd, chemist of the Albany & Rensselaer Iron and Steel Company, finds it contains:

Carbon	·110	Phosphorus	·346
Silicon	·014	Manganese	·530
Sulphur	·126		

This shovel is not an isolated case, but hundreds of them have been made from the same grade of metal. These other samples are also from the phosphorus metal, while these button-head bolts, bent double in the thread, are from metal made from ordinary Bessemer pig. Several physical tests have been made from these phosphorus steels, some from pieces rolled from the sprues or gates made in bottom-casting, and others from specimens rolled from perfect ingots. From the latter, which are the only fair tests, the results have been:

DATES.	Tensile Strength. Pounds.	Elastic Limit Pounds.	Elongation. Per cent.	Reduction of area. Per cent.
October 27th, 1884	74,790	55,070	25·25	48·8
November 11th, 1884	80,030	55,060	23·00	26·9
November 11th, 1884	80,270	56,290	22·75	30·6
November 11th, 1884	80,420	56,290	17·50	14·3
November 11th, 1884	78,730	56,410	14·25	15·3
February 4th, 1885	80,940	58,570	24·00	36·4
	79,870	58,570	23·25	36·4
	80,670	60,240	23·00	32·5
	79,700	59,550	23·25	37·6

In all cases, one half-inch round test-pieces were used, eight inches long.

The steel tested on February 4th had the following composition:

Carbon	·08	Manganese	·48
Silicon	·01	Sulphur	·09
Phosphorus	·50		

How far and with what certainty the use of high phosphorus irons can be carried remains to be determined. The works of Messrs. Oliver Brothers & Phillips have been so pressed with orders that I did not feel at liberty to further interfere with their running. The demand for Clapp-Griffiths metal increased to such an extent that it became evident they must be altered to permit of a greater output. This is about completed, and when they resume, I have no doubt the experiments will be continued. While at this time not entering into the discussion of the effects of silicon in metals, one very striking peculiarity of the steel made in the Clapp-Griffiths converter claims our attention. In all the determinations of silicon in this metal which I have seen, and they have been many, there have been but four showing over ·02 per cent of that element, and they were from spoilt heats, while 50 per cent of the analyses have given but ·01, and in 12 per cent of them the silicon has been too low for estimation.

The nails shown had but ·009 silicon, and the shovel but ·014 per cent. Does not this low silicon permit of the high phosphorus? The loss in the process is much higher than in the ordinary Bessemer converter. No doubt this comes from the column of iron being so shallow over the tuyeres. It is a marked peculiarity of the blows that red smoke from burning iron appears at the very commencement, but clears away toward the middle of the heat. The cinder soon rises and runs off at the tap-hole. Presently this flow of cinder entirely ceases. Now, is it not plausible that the early oxidation of iron furnishes a base which carries off the silicon of the bath? And does not this, with the low blast-pressure, account for the constant small percentages of silicon in the metal? There must be a reason for it. The percentages of silicon in the pig used vary largely; but something constantly eliminates it. Low silicon steel is and can be made in the ordinary Bessemer converter, but I have never, to my knowledge, made steel having silicon so low as .01 per cent, and we well know that it is not a constant characteristic. I do not speak of the higher carbon steels, for in their manufacture considerable silicon is introduced with the recarbonizer. I am fully convinced that the Clapp-Griffiths converter possesses great value for this country. While believing that it can not make rails or ship-plates in competition with the regular Bessemer plants, it can compete with them in small products, even if it does not make an article which they can not produce. And most certainly the open hearth is out of the race, so far as cost of product is concerned.

Professor Tunner has lately taken position against both the Avesta and Clapp-Griffiths or any other small converter, so far as their value relates to making low carbon steels. He admits that they may be of use to certain Alpine districts of Austria; but for producing soft metals, he favors either the basic or Siemens-Martin processes. It is with great hesitation that I venture to differ from so eminent an authority. My excuse must be that I speak for America, he for continental Europe.

To place a basic plant on an equality with an acid one in the matter of costs, it seems to be well established that the basic iron must be quite $3 per ton cheaper than the pig for the acid process. Then the plant is a very expensive one—much more so than the regular Bessemer. You must build both a steel-works and a brick-yard. In continental Europe, where labor is so ill paid and the phosphorus ores so much cheaper than the purer ores, the status is no doubt quite different. This is leaving out of consideration any use of high phosphorus irons in the Clapp-Griffiths. But if further experience proves that, for many purposes, we can take either a mixture of 50 per cent Bessemer at $17 and 50 per cent mill-iron with 1 per cent of phosphorus at $15, making pig cost $16; or take cheap irons, which can be made in so many sections with from ·30 per cent to ·50 per cent phosphorus, we ought to produce, as previously shown, a metal for $21.95 per ton of ingots, and these ingots of a size and shape to be rolled into many finished products. As intimated before, the demand for low steels is constantly increasing. Take steel nails, for instance. If they have not already replaced iron ones in the market, they are rapidly doing so, and all the resolutions of lodges of the Amalgamated Association will not stop the irresistible march of events. To supply this demand, in my judgment, the modest Clapp-Griffiths converter offers peculiar advantages.

The accompanying drawings, exhibited in connection with the papers of Messrs. Witherow and Hunt, represent the improved constructions about to be put in operation at Pittsburg, at the works of Messrs. Oliver Brothers & Phillips. Figs. 1, 2, and 3 give a section plan and elevation, respectively, of the works. They contain two 3-ton converters, back of which is a cupola, with a stock-hoist, room being left for a second cupola, which will be erected when the plant is to be run up to its full capacity. This cupola discharges its contents into an intermediate weighing-ladle (shown in the section and in the plan) which travels along a track parallel with the row of converters. From this ladle, the pig is poured into the spouts leading to the respective converters in the manner indicated by dotted lines in the section. The converters themselves are hung in wrought-iron framework, raising them some distance above the floor line and making the working-floor about ten feet above the general level. The bottoms are handled by means of a carriage. When a bottom is defective, the hydraulic hoist, shown in the section, is run up with the carriage upon it, the bottom is loosened, the blast connection broken, and the whole is lowered to the ground-floor. The truck, supporting the bottom, is drawn along the track to the last turn-table by means of a vertical hydraulic cylinder with chain and sheaves. This vertical hydraulic cylinder is shown in the elevation, with the position of the main sheave at its highest point indicated by dotted lines. A new bottom, which has been previously prepared, is then taken from the drying-stove nearest the converters, run out upon the turn-table opposite, and placed upon the hoist, which is then lifted and the bottom fastened into place, the joints made, and operations resumed. It will be observed from the plan that there are three of these drying-stoves. The dotted lines on the plan indicate the trucks and the turn-table arrangements upon which the bottoms are conveyed.

In front of each converter, is a peculiar swinging track, arranged for conveniently tapping the steel-ladle into the ingot-molds, which stand upon a truck below in nests of four, five, or six, as may be desired. The mold-truck stands upon a track leading out of the building. The blast for the cupola is furnished by a Sturtevant blower, operated by a small vertical engine placed nearest the hydraulic pumps. A larger engine, with 16-inch steam cylinder, 48-inch blowing-cylinder, and 30-inch stroke, furnishes the blast for the converters. Room has been left for a second engine of the same size. The blast is conveyed to the converters in the manner shown. Steam is furnished to the engines and pumps by three boilers, 44 inches in diameter and 26 feet long, with two flues in each. These boilers are fed with a "doctor" boiler-pump, the water passing first through a feed-heater. The power for the hydraulic lift and bottom truck-hauling cylinder is provided by hydraulic pumps and an accumulator.

It is estimated, upon the basis of work done with the old plant, that

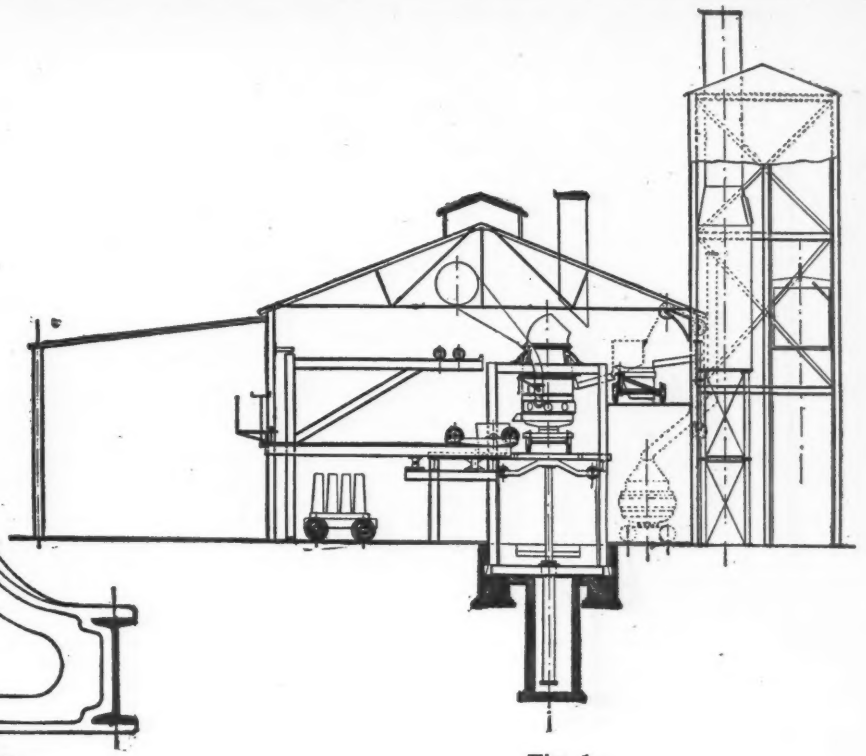


Fig. 1.

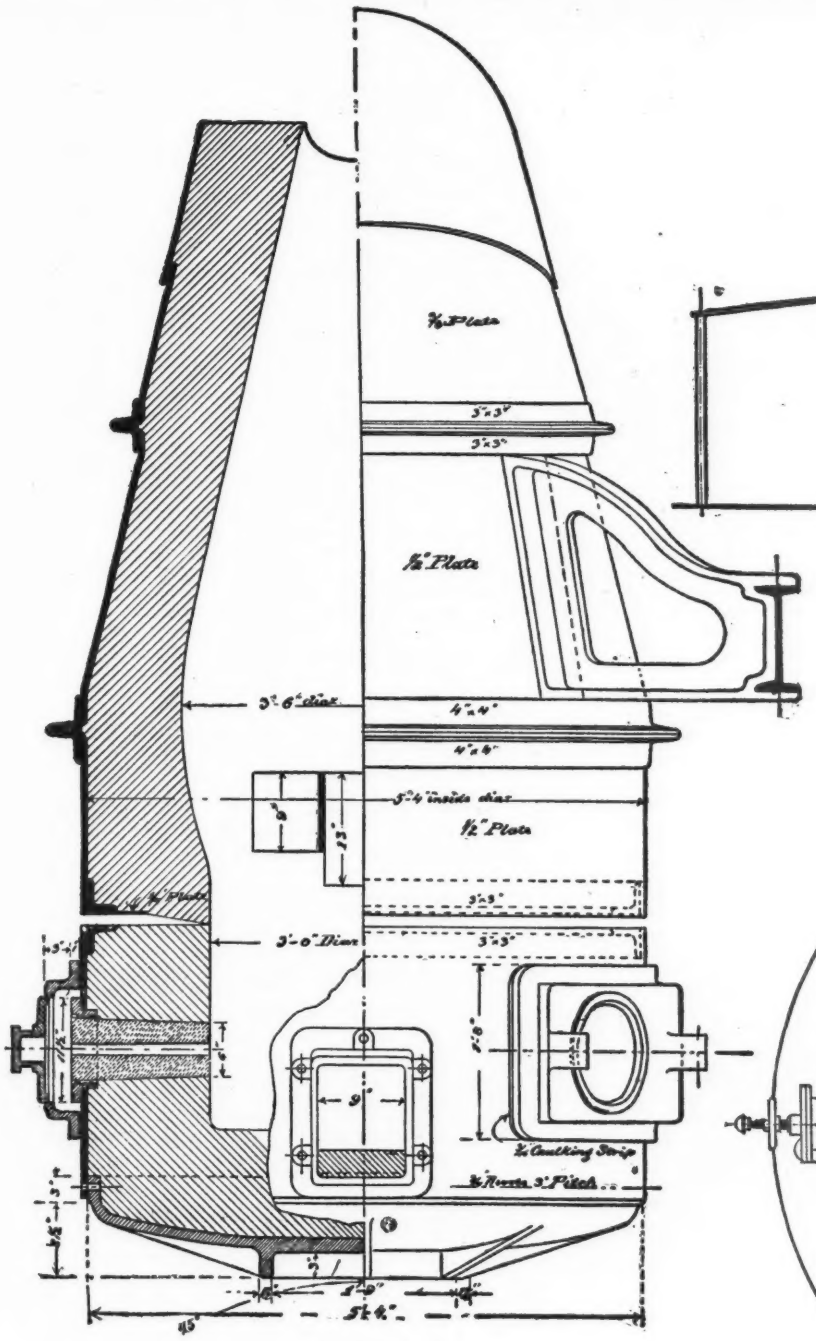


Fig. 6.

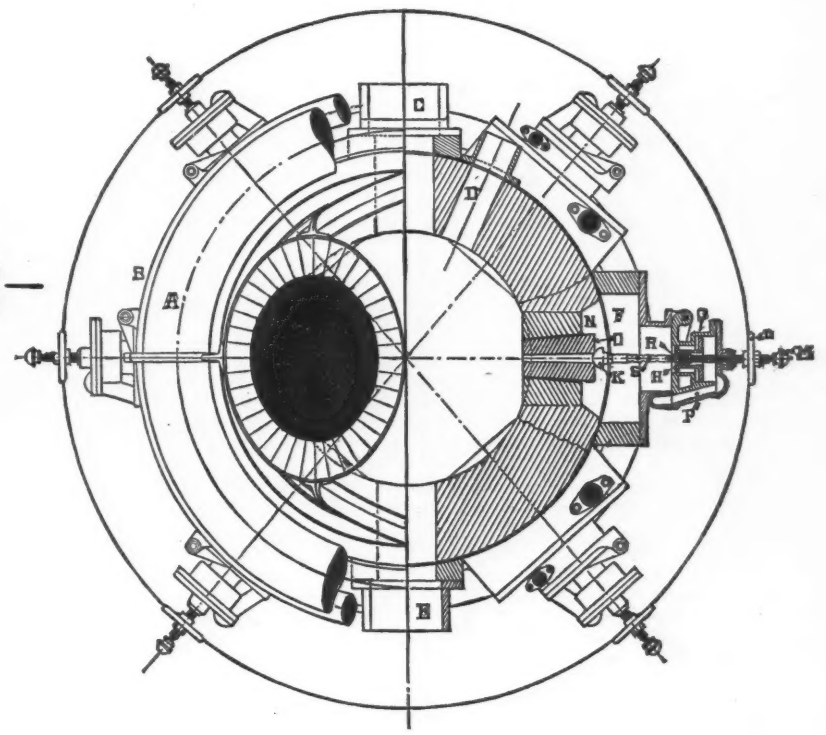


Fig. 5.

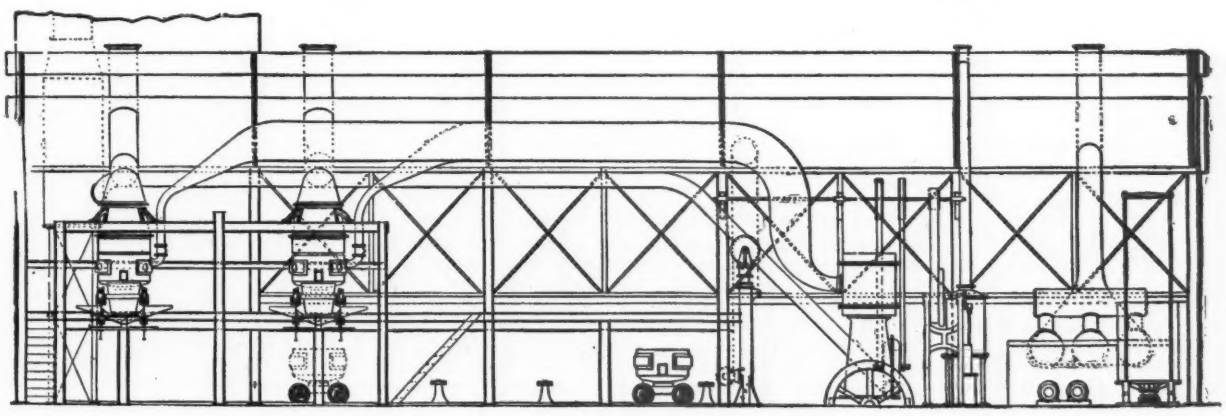


Fig. 3.

THE CLAPP AND GRIFFITHS PROCESS.

this remodeled plant will, with two cupolas, have a daily capacity of 150 tons of ingots in twenty-four hours, provided there are sufficient hydraulic cranes and other appliances for handling the ingots.

Figs. 4 to 7 present two different forms of converter, the first, shown in Figs. 4 and 5, being similar in design and construction to the fixed-bottom converters at the Margrin Works, Wales, and a number of other works in England. It is a counterpart of the ones first erected at the works of Messrs. Oliver Brothers & Phillips, Pittsburg. *A* is the main wind-pipe carrying blast for the tuyeres, and controlled by a large valve. *B* is a subsidiary pipe carrying the same pressure of blast, leading into the chamber *G* containing a differential piston. *C* is the charging-hole; *D* the cinder-notch or slag-tap; and *E* the tapping-hole. *F* is the main wind-box, into which the blast from the pipe *A* is conveyed, and from whence it passes through the tuyeres *O* into the converter. *G* is the differential-piston cylinder; *H* the differential piston; *K* the stopper; *L* the stopper-rod hand-wheel; *M* peep-hole cap; *N* the tuyere block; and *O* the tuyeres. *P* is a passage from down-take from the pipe *B* to the back of the differential piston *H*. *R* is the stopper-rod adjusting-screw. and *S* the stopper-rod.

The automatic closing of the tuyeres is effected thus: At the moment the blow is finished, the valve leading to the secondary pipe *B* is opened fully, driving the blast through the passageway *P* (shown on plan) into the cylinder *G* behind the larger end of the piston *H*. The pressure of blast being the same in the cylinder *G* as in the wind-box *F*, as the piston *H* is double-faced, having one end of considerably larger diameter than the other, the same pressure of blast per square inch introduced into the chamber *G* forces the piston and stopper-rod against the end of the tuyere *O*, closing the hole therein, except for a small aperture in the stopper *K*, fed by the holes shown through the hollow stem *S*. This small amount of blast suffices to keep the molten metal from running back into the tuyeres, keeping them free and open. The metal is then tapped out. This operation is simply reversed when the molten metal has been poured into the converter, the blast remaining on in the main pipe *A* as long as operations are continued. As soon as the molten metal has reached a sufficient depth, and the blow is to begin, the valve of the pipe *B* is closed, the pressure removed from the back end of the differential piston *H*, and the effect of the blast in the wind-box *F* is to drive the piston *H* out, driving back the stopper.

In the new converters, illustrated in Figs. 6 and 7, this arrangement was not adopted, because the removable bottoms rendered it undesirable, the wind-box and tuyere arrangements being entirely different. No pipes whatever corresponding to the pipes *A* and *B* of the old converters are used. The blast is simply led into an annular chamber or wind-box surrounding the bottom of the converter, except for a short distance on the front side, to allow room for the tapping-hole. The blast at the end of the blow is not entirely cut off, but its pressure is regulated and reduced by any one of several patented devices, which makes it possible to keep a uniform pressure at the noses of all the tuyeres, thus accomplishing the same purpose as the differential piston and stopper of the old converter, namely, to keep the tuyeres free from molten metal or slag. In practice, it is found that this works with perfect certainty. Before pouring the metal for the next blow, it is necessary to open the doors, introduce a light pricker-bar, and break off the slight film of chilled metal that may form over the nose of the tuyere. Opening the door, as shown in Figs. 6 and 7, is very easily effected, it being only necessary to twist the handle about 12 or 15 degrees, which releases the three spring-catches and allows the door to open.

The lining of the converter, which is gannister, is 12 inches thick, the centers of the tuyeres are 9 inches above the bottom of the converter, and the depth of metal above the center of the tuyeres is from 8 to 10 inches above the bottom of the converter. The smallest ingots thus far cast at the works at Pittsburg have been 6 inches square.

DISCUSSION.

WILLIAM KENT, New York City: We ought to have more complete data to enable us to understand these interesting results. Mr. Hunt has told us, for instance, that iron is oxidized early in the operation. I would like to know whether any estimate has been made of the temperature and of the changes of flame at the different periods of the process. As to the cause of the good quality of the resulting metal, in spite of the presence of phosphorus—a result which Mr. Hunt ascribes to low silicon—may it not be rather due to the fact that there is less oxide of iron in this metal? Also, what is the total time of the operation?

Mr. HUNT: Exact determinations of temperature have not been made. That it is not a low temperature (speaking as a Bessemer engineer), I should infer from the fact that of all the heats I have seen made at these works, and from all the records which have been given me, I have found only one instance where there were any "sculls" in the ladle. As I have said, we have volumes pouring out at the very commencement, of brown iron-oxide smoke. The whole thing looks as the Bessemer converter does when it is turned over, with air blowing across the top of the metal, as undoubtedly Mr. Kent knows is often done when we have a "cold heat." I agree with Mr. Kent that the absence of oxide of iron has a great deal to do with the good quality of the final product. So has the fact that the slag has been got rid of, and is not in the ladle when ferro-manganese is added. As to the time of the operation, to blow 4000 pounds takes from ten to eleven minutes, and sometimes runs up to fourteen.

G. W. MAYNARD, New York City: In 1878, I had occasion to examine the Smyth process at Gorton, near Manchester, England. The process was one of the many delusions where small doses of chemicals were to make good iron or steel out of poor stock; so I will not occupy your time with an account of the claims, but will only call your attention to the vessel, called the metal-receiver, in which the so-called operation of refining was carried on, and the results therein obtained. The vessel was an arched oblong box with a central opening at the top to permit the escape of the products of combustion, and had the following inside dimensions: length 6 feet 6 inches, width 3 feet, hight to slagging-holes 1 foot 6 inches. "The tuyere openings are brought to the *level* of the bottom, *whereby the blast is made to pass through the entire column of metal*. A blast pressure of from 2 to 3 pounds is found to be sufficient." These words I quote from the patent claim of the inventor.

From a long series of tests, I select the following as a fair average of the results obtained;

The iron treated was Bolckow Vaughn's No. 4 pig. Nine consecutive blows of 5 tons each were made. The analysis of the pig showed the following composition:

Carbon	3·9400	Sulphur	·0250
Silicon	1·7260	Phosphorus	1·7807
Manganese	·6628		

In the first two blows, the resultant metal showed an increase of phosphorus, while in the last five there was an average decrease of ·1421 per cent, which was brought about by drawing off the cinder from twelve to fifteen minutes before the metal was tapped. Total duration of blow, from 25 to 30 minutes. Three charges were analyzed for silicon, showing respectively a decrease of ·9366, ·7459, and ·9608. The metal was, of course, valueless except for further manipulation in the puddling-furnace, where it eventually found its way. I call attention to these experiments for the purpose of showing how greatly the results differ from those given by Mr. Hunt, although the method of treatment is apparently so nearly identical. If the excellent results claimed are really due to the raising of the tuyere-nozzle, it would be interesting to determine the exact point of *best* results by depressing the tuyeres to the bottom of the vessel, and then raising them by stages, of say an inch at a time, and noting the changes by chemical and physical tests. There is certainly a wide field for chemical research. For the details of my investigation of the Smyth process, I refer to the *Metallurgical Review* of April. 1878.

WILLARD P. WARD, Ph.D., New York City: The extraordinarily good quality of this steel, considering the large amount of phosphorus, can be explained, I think, by the low silicon which it contains. The fact that good steel can be made with much more than the amount of phosphorus contained in Bessemer metal is not new. I would call attention to a paper read by Mr. William Hackney before the English Institution of Civil Engineers, Session 1874–75, showing that eleven years ago it had been pointed out to steel manufacturers that a steel tough enough and strong enough for most purposes could be made from iron containing much more phosphorus than is generally allowed in Bessemer pig, if "the carbon and probably also the silicon were kept low enough." The development of the Clapp-Griffiths process, producing a pneumatic metal so low in silicon, proves, I think, the correctness of Mr. Hackney's proposition, and shows that at an early day he had a clear insight of things not generally understood, or at any rate not put in practice.

As Mr. Kent has spoken of the oxide of iron causing red-shortness, it may be interesting to know what Mr. Hackney's views were on this point. He says that in red-short, low-carbon steel, two conditions are found, namely, the presence of oxygen or oxide of iron, and a low percentage of manganese; but in high carbon steels, which contain no oxygen or oxide of iron, red-shortness shows itself as soon as the percentage of manganese falls below the proper limit. The author was evidently of the opinion that had sufficient manganese been added, neither the low carbon steel nor the high carbon steel would have been red-short.

Mr. HUNT: There may be interest in the analysis of a steel rail which once before did duty at a Pittsburg Meeting of the Institute, when it was brought forward by Captain Jones. The rail was a Terre Noire high phosphorus rail, having carbon ·12, silicon ·025, phosphorus ·223, manganese ·387.* It showed a tensile strength of 78,000 pounds, elastic limit 39, and an elongation of 37 per cent. These rails were made in a Siemens-Martin furnace, you remember, and they could not be made to compete with the cheap Bessemer rails.

Mr. Holley, in 1877, investigated a process brought out in Boston, known as the Sherman process, that sought to eliminate phosphorus, or at least to make good steel out of iron that had plenty of phosphorus. His report was not favorable.

That steel was not worth a cent. You could not do any thing with it. I tried to roll it and do the best I could with it. In the testing-machine, it showed tensile strength, but it ended at that. It would not bear heating. But in every case, analysis gave silicon ·075, ·090, ·074, ·094, ·087. I believe that is the reason the steel was good for nothing. If he had got rid of that silicon, Mr. Sherman would undoubtedly have floated his process.

FRANK FIRMSTONE, Glendon, Pa.: If I recollect aright, the first trial of the Bessemer process at an iron-works was made at Dowlais, and the first blow produced good material, which they were unable to get again in subsequent blows. So far as I know, that was never accounted for. I believe no analyses of that first good steel at Dowlais were published, but it does not seem possible that they could at that time have got even by accident any pig-iron low enough in phosphorus to rank as a Bessemer iron according to present standards. It would be interesting now to see whether by some fortunate accident they did not blow it by the Clapp-Griffiths process.

This paper seems to throw light on another point, namely, the lack of a satisfactory explanation hitherto of the fact that bar-iron with a good deal of phosphorus in it was not bad, while Bessemer steel containing vastly less phosphorus was utterly worthless. It now appears that a good Bessemer metal may be made containing a comparatively large percentage of phosphorus.

W. F. DURFEE, Bridgeport, Conn. (by letter to the secretary): In continuing the discussion of the very interesting and valuable papers of Messrs. Witherow and Hunt, I take great pleasure in saying that I regard the process described as destined to occupy a very important if not a commanding position among the methods by which the steel of the near future is to be produced.

This opinion is not altogether the result of a study of the process described, but, as regards two of its distinctive features (a stationary converter having a tap-hole similar to that of an ordinary cupola, and the low pressure of blast employed), originated at the time I was engaged in the supervision of the experimental steel-works at Wyandotte in the

* NOTE BY THE SECRETARY.—Mr. Ward and Mr. Hunt can find still earlier and more striking instances in Vol. III., p. 132, of these *Transactions*, where analyses of soft Martin boiler-plate steel, made by F. J. Slade, in 1869, are given, with comments from Sandberg, Britton, Hewitt, and others. One analysis shows P, 0·275; C, 0·12; S, 0·025. Mr. Slade made several hundred tons of such steel, and found it excellent.

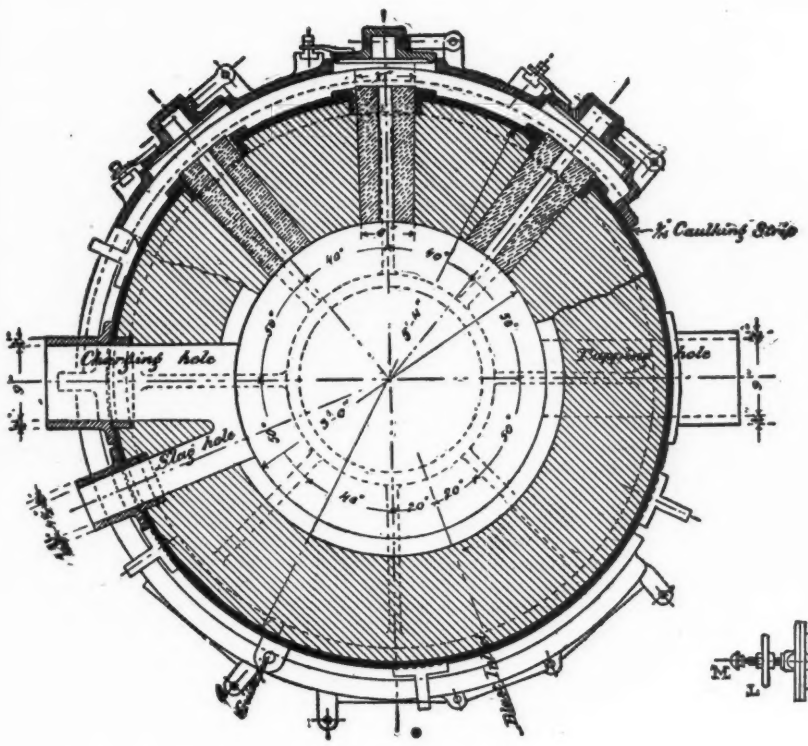


Fig. 7.

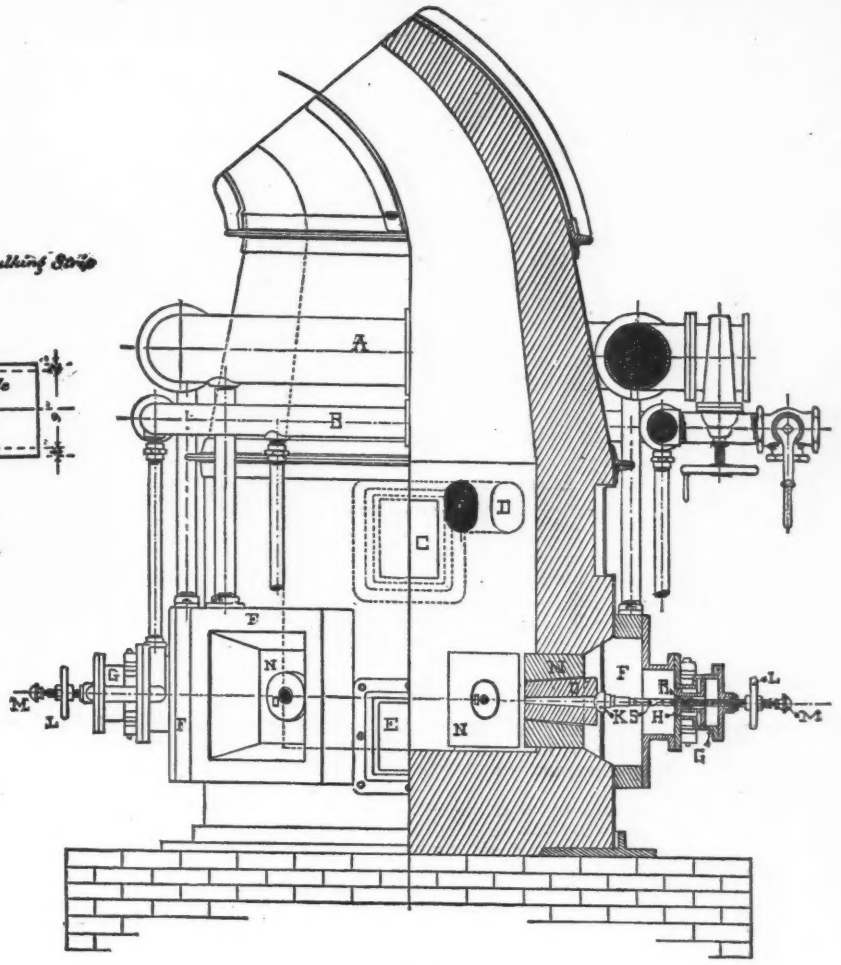


Fig. 4.

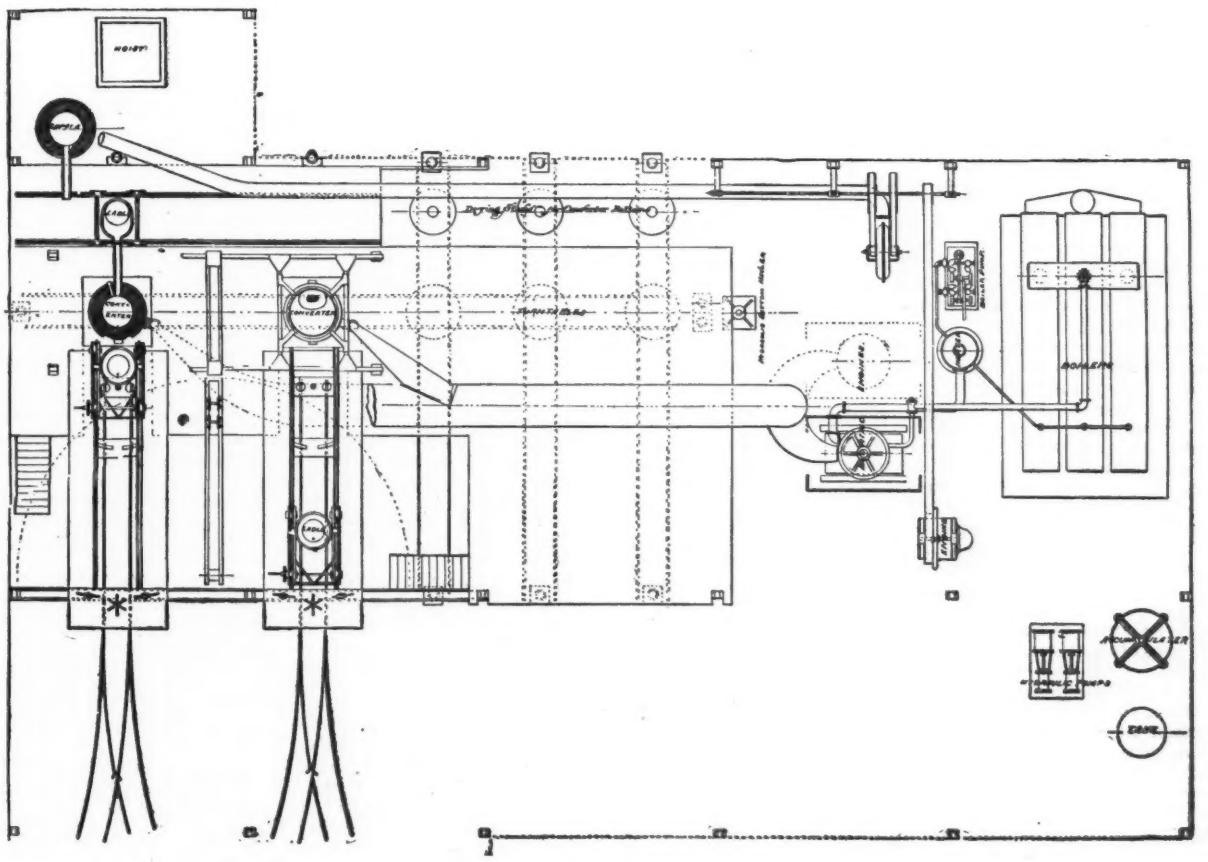


Fig. 2.

THE CLAPP AND GRIFFITHS PROCESS.

years 1863–64, and I then designed and erected a stationary converter, a vertical section of which is shown in the accompanying drawing:

This converter was the joint invention of the late Z. S. Durfee and myself. It was provided at the outset with a removable bottom (this feature, I am told, is one of the recent improvements in the Clapp-Griffiths process), and, as a result of my study of the working of the Bessemer converter, I decided to "blow" with a pressure of blast not exceeding eight pounds, which was but half that used in the Bessemer converter.

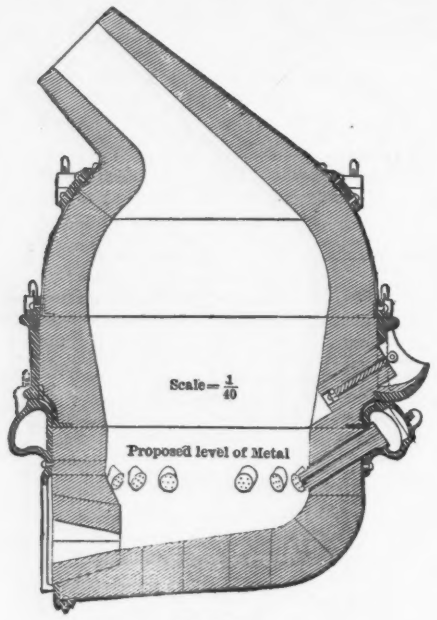


Fig. 8.

It will be noticed that the tuyeres are inclined, and have their outer ends in a wind-box above the proposed level of the metal. This construction I regard as decidedly better than the horizontal valve-closed tuyeres of the Clapp-Griffiths converter.

Only a few heats were blown in the converter illustrated above, and these were blown, after I ceased to be connected with the Wyandotte Works, by Mr. R. W. Hunt. For reasons, doubtless satisfactory to the owners of the works at the time (but which I have always regarded as fallacious), the experimental work with the stationary converter described was not continued, and the opportunity of making a substantial and valuable progress in the metallurgy of iron and steel was lost.

Mr. HUNT (by letter to the secretary): Owing to defects in the refractory lining of the stationary converter, and our want of knowledge of an alloy containing a large percentage of manganese—in fact, ferro-manganese—and thinking we had to run the melted spiegel into the converter, together with other reasons not necessary to mention, but a few heats were attempted in Mr. Durfee's converter, and it was replaced by a regular rotating one.

THE NEW MINING CODE OF MEXICO.*

By Richard E. Chism, M.E., Saltillo, Coahuila.

(*Continued from page* 385.)

II.

The second title of the code treats of the authorities who are to deal with and take cognizance of mining matters. According to this chapter, the mining industry, so far as it relates to administrative and economical questions, is to be dependent upon the Ministry of *Fomento*† and the functionaries made subordinate to that ministry by the present code. The decision of disputes between individuals is left, as in the old law, to the ordinary judges and tribunals.

This chapter goes on to establish in the City of Mexico a corps of engineers and miners, subordinate to the Ministry of Encouragement, which is to be composed of three graduated experts and three mine-owners, and which is to be a consulting council for the encouragement of mining. It is to deal with all scientific, economical, and administrative problems that may be submitted to it by the Ministry of Encouragement; and it is to promote, in a general way, the improvement and advancement of mining. Mining deputations, established in any mineral district where the Ministry of Encouragement may deem it necessary, are to exercise all the administrative and economical functions marked out for them by the code.

From other articles of the code, and its accompanying regulations, we learn that these functions are the registration of denouncements and the proceedings in connection therewith, the giving of possession of mines, granting licenses to explore for new mines, examination of mines from time to time, to see if they are worked conformably with the code, the collection of mining statistics, the supervision of new works of importance, such as drainage-tunnels, etc. In the absence, at any place, of a mining deputation, its functions are to devolve upon the highest executive authority of the place. Title II. goes on to prescribe that, in important mining districts, there shall be a graduated expert attached to each deputation as its official adviser, and also that the Secretary of Encouragement may nominate as many mining engineers as may be necessary, inspectors to visit the mineral districts, and to make reports of their studies and examinations for the information of the bureau.

III.

Title III. treats of explorations for the discovery of mines, and declares that every inhabitant of the republic, native or foreigner, shall have the free right to explore for minerals in public lands with excavations that must not be over five meters in depth or diameter, except when made by boring-machines, in which case they may be of any depth. In case the ground should be private property, and opposition to prospecting should be made on the part of the owners, application must be made to the head executive authority of the place, who can grant permission to explore under certain restrictions. If the land in which the prospecting is to be done is neither fenced nor cultivated, the authority shall issue the permit to explore on the explorer's giving a sufficient bond to be responsible for the damages that the explorations might cause to the owner of the property. In case the land is fenced or cultivated, the authority shall hear the interested parties, and shall appoint an expert to report upon the necessity of the exploration and the damages that may be caused thereby, and the permit may be granted or denied, as the authority may deem proper. In any case, the explorer must give his bond, within ten days, for the estimated damages, without which bond the permit can not be issued. The permit must clearly express the place or places where the exploration is to be made, the number of men to be employed therein, and is always to be understood to be granted on condition that the time to be employed in searching for minerals is not to be more than one month, which, for well-founded reasons, can be extended, after a new application, to two months, and that the depth and diameter of the excavations is not to exceed five meters, except when boring-machines are used. During the time necessary for obtaining the permit, during the time which the latter is to run, and for one month after, neither the owner of the land, nor any person except the prospector, can denounce a mine of any substance whatever, either in the place designated for the search or within a distance of 300 meters from the same in all directions. The prospector loses his exclusive right to denounce, if he does not do so within one month after the expiration of his permit to explore.

The consent of the owner is indispensable to enable prospecting to be done within any house or edifice or its dependencies, or within a distance of thirty meters from the walls of such property, and no prospecting will be permitted in the streets or public places of a town, nor within thirty meters from the exterior lines of roads or canals, archways, aqueducts, dams, bridges, etc.

The prescriptions just recited are certainly no more than equitable in view of the progressive settlement of Mexico. There is, however, every reason to fear that they will, in many cases, prove a hinderance to prospectors and be used for purposes of blackmail. The provision as to the depth and diameter of prospect-holes is plainly one of those laws that are made to be broken. No prospector will limit himself to such dimensions, if he thinks there is any thing to be gained by going farther, especially as there is no penalty attached to non-observance of the law.

IV.

The fourth title of the code treats of the mode of acquiring mines, placers, abandoned metallurgical works, or sites to establish works, and of the waters to be used for water-power in metallurgical establishments and mines. The title to the above is to be originally acquired by judicial award made in virtue of a denouncement. A denouncement may be made as of a discovery, on account of abandonment, or for forfeiture or extinction of the title of a former owner for non-obedience to the precepts of the present law in those cases that it expressly determines. A discovery may be of a new mineral district, of a new deposit in a known district, or of a new mine in a known deposit.

The discoverer of a new mineral district, or the restorer of an abandoned district in which no work has been done on any of the mines for one year, is to have a right to three consecutive claims on the principal vein or deposit and to one more on each one of the other veins of the same district. If the discovery or denouncement should be made by a company, constituted according to the present code, it shall have a right to four consecutive claims with the measurements as fixed in Title V. of the code.

A mine is to be considered deserted and abandoned, and may be adjudicated to any one who denounces it, after a cessation of work for twenty-six weeks, consecutive or interrupted, during the year previous to the denouncement.* In case of disturbances of the public order, or of other great calamities within twenty leagues of the mines, the work can be suspended on them, and they shall not be open to denouncement for desertion until tranquillity has been restored, and a proclamation to that effect made by the Mining Deputation of the place, when the owners are to have four months' time to commence work.

A license to suspend work on any mine for more than twenty-six weeks may be obtained for good and sufficient cause from the mining deputation of the place, which may grant such a license for six months only.

An especial permit to cease work for a period of more than six months, and not to exceed one year, can be obtained, after good cause shown, from the Ministry of Encouragement. In no case can these permits be prolonged beyond the time once granted, and no second permit to cease work can be extended to the same mine within a period of three years. A permit to cease work may also be granted by the Mining Deputation for the purpose of enabling a mine to be held during the accomplishment of works in other neighboring mines, which are to facilitate the exploitation of the one in question.

A mine may be denounced as badly worked when the life of the workmen is in danger on account of the workings being in a ruinous or insecure condition, or when the workings are so badly ventilated that the lights refuse to burn, and the health of the workmen is in danger, or when the necessary drainage of the mine has been stopped for twenty-six weeks during the year preceding the denouncement.

In case of a denouncement for the preceding reasons, the Mining Deputation is to have the mine examined by an expert, and, if any of

* A paper read at the Chattanooga Meeting of the American Institute of Mining Engineers, May, 1885.

† This ministry corresponds to our Department of the Interior. If we translate *Fomento* by "Encouragement," which is its nearest English equivalent, the full title of the office will be, "Ministry of Encouragement, Colonization, Industry, and Commerce."

* This is a considerable change from the old *Ordinances*, which allowed a suspension of only four months.

the above defects are found to exist, the owner is to have a term of six months in which to correct them. If the owner should fail to do so, the mine is to be awarded to the denouncer, provided the latter shall give a bond for the costs of changing the defective portions of the mine or of re-establishing the drainage.

The rest of Title IV. is devoted to laying down the proceedings to be followed in cases of denouncement for discovery or abandonment. The most important parts of these are, that the denouncement is to be published during three weeks in the official newspaper ot the district or State; also, the former owners of an abandoned mine are to be cited if known. If the denouncement is of a vein, the denouncer must open a shaft and gallery on one of the walls. These workings are to have a section of one and one half meters of side or diameter, and to be five meters deep and long. In a mass-deposit, equivalent excavations must be made in two different directions sufficient to give an idea of the nature and geological formation of the deposit. The administrators, dependents, or workmen of any mine are prohibited from making denouncements within eight hundred meters thereof, and no denouncements can be presented to take effect in case a former one should be disallowed. In case of dispute between discoverers, the first registry is to prevail, and the right of any denouncer is to be forfeited in case he does not do the necessary work, as above described, within four months from the date of his denouncement, or within such additional time, not to exceed two months, as may be granted by the Mining Deputation.

A metallurgical work is held to be abandoned when the roofs, machinery, tools, and timbers are entirely gone, even if the walls, etc., should be standing; or, if no work has been done therein during three years, and if the owner, on being notified by the Mining Deputation, does not re-establish the works in a term not to exceed six months. In case of denouncement of a metallurgical works or mine, the former owner may claim and must be paid the value of any serviceable sheds, machines, etc., which he may have left there.

Any unused current or fall of water may be denounced to be employed in a mine or metallurgical works for motive power, or for working the ores, and the denouncement shall pass through the same proceedings as those of mines.

Any water-right not used for a period of twenty-six weeks may be denounced as abandoned.

The waste-piles and dumps of mines are not denounceable except by denouncing, at the same time, the mines to which they belong; the slag-piles and slime-pits of metallurgical works can also only be denounced with the works themselves.

The miner who needs to occupy any part of the surface of the ground to open mine-entrances, or to establish roads, workshops, dams, aqueducts, or for the purpose of utilizing the superficial part of any deposit, must pay the value of the ground, leaving that of the mineral out of consideration. This valuation is to be made by experts—one named by each party, and a third by the Mining Deputation.

(TO BE CONTINUED.)

MODERN AMERICAN METHODS OF COPPER SMELTING.*

By Edward D. Peters, Jr., M.E., M.D.

CHAPTER IV.—CONCLUDED.

HEAP ROASTING OF MATTE.

There remains only in connection with this portion of the subject to notice the slight deviations found necessary to adapt this method to the treatment of matte.

These artifically formed sulphides, containing variable percentages of sulphur, may be sufficiently desulphurized in heaps, nor has their chemical composition any marked effect upon the result, provided lead is not present to such an extent—fifteen per cent or more—as to increase the fusibility of the material.

The most marked distinction between the behavior of ore and matte, when submitted to this process, is the fact that, while the former substance may be satisfactorily oxidized by a single treatment, the latter invariably demands two, and oftener three or more, separate burnings before it is properly prepared for the succeeding fusion. There is no exception to this statement, which, if properly understood, would prevent the disappointment frequently experienced by those unaccustomed to this method of desulphurizing matte, and who are led to condemn the practice on finding, at the conclusion of the first carefully conducted burning, that the only visible results are a slight scorching of the surface of each fragment, a change in color from the original brownish-black to a brassy yellow, and a more or less extended fusion of such portions of the heap as have sustained the greatest heat. In reality, the influence of the process has been much more profound than can be realized from external appearances, and although neither the removal of the sulphur nor the oxidation of the iron and copper has progressed to any great extent, a certain change in the physical condition of every fragment of matte has been effected that prepares it perfectly for a second burning, and which seems a necessary preliminary to the actual desulphurization.

Each succeeding operation requires a slightly increased proportion of fuel, as the volatilization of the sulphur and the oxidation of the metallic constituents deprive the matte of its internal sources of heat, and at the same time greatly lessen its fusibility.

For the first roasting, a bed of wood should be prepared similar to that for a heap of ore, although smaller in area; for it is difficult to regulate the temperature and prevent matting in a heap much larger than twelve feet square, and this will be found a convenient size to hold from sixty to seventy tons of matte when raised to a hight of about six feet. A single chimney in the center is sufficient, and about this structure the broken matte should be heaped just as it comes from the crusher or spalling-floor, and regardless of the fines that it contains. The presence of these has been found necessary to check the rapidity of the operation, and prevent the fire from suddenly spreading through the entire pile in a few hours without accomplishing any useful result, though generating for a short time a temperature high enough to fuse a large proportion of the contents into a single lump.

Less care need be taken in shaping a matte-heap than in the case of ore, and it is merely necessary to build it up in the form of a rude mound, which may best be covered with thoroughly burned ore from the roast-heaps, most of which on handling will crumble to a sufficient fineness for the purpose, while any hard lumps may be removed with the dung-fork. This obviates any screening or classifying of the matte in the open air, which always entails a heavy loss, owing to the great value and excessive friability and lightness of the material after calcination. If, as is usually the case, the proportion of fines after the first burning is found so great as to endanger the proper combustion of the heap for the second operation, the mechanical loss may be reduced to a minimum by separating the excess of pulverized matte by the use of a dung-fork, with tines closely set, during the turning of the ore from the heap just finished on to the fresh bed of wood, and at the conclusion of the process, removing the fines that are thus isolated, either directly to the smelting-house, or, if they still contain too much sulphur, to the calcining-furnaces. The covering of the original heap, consisting solely of roasted ore, should be stripped off, and either sent to the smelting-furnace or again used for a similar purpose. It need hardly be mentioned that the presence of arsenic or similar impurities in the ore, in greater quantities than in the matte, should prevent any such practice as that just recommended, and it may be accepted as a universal rule in copper smelting that no impure ores or products should ever be mixed with those freer from deleterious substances.

Under no circumstances, need a matte-pile be covered as thoroughly as a roast-heap consisting of ore, nor can the formation of a considerable amount of matte, which in ore-roasting would be evidence of a great want of skill or care, be considered as a reproach, experience having so conclusively shown the impossibility of preventing its occurrence that, unless about one eighth of the lower portion of a matte-heap is thus fused, no thorough oxidation of the remainder will be effected. The time necessary for the operations just discussed varies according to the quality of the matte, the condition of the weather, and certain other factors, but will in general be, for the first burning, eight days, while on the tenth day the heap will be sufficiently cool to permit its turning on to a fresh layer of fuel. The second operation requires a day longer, and the third a day less than the first burning.

To those familiar with the practice of heap roasting as applied to ores, no particular directions are necessary except that care should be taken that the large blocks of matte that are formed during each burning be well broken up and placed near the center of the heap next constructed, that they may have every opportunity for a thorough desulphurization. Whatever raw matte still remains from the last burning is best reserved until the construction of a fresh heap furnishes the proper means for its treatment. At the last two burnings, it is well to introduce two or more layers of chips, bark, or other refuse fuel into the matte-heap; for it will act powerfully in decomposing the sulphates that at this stage are formed in considerable amount, and also exercise a similar and most marked effect on whatever compounds of arsenic and antimony may be present. This simple measure had a sufficient effect in a certain instance in the experience of the author to be plainly noticeable in the quality of the ingot copper produced.

No attempt to pick out such pieces of raw matte as still remain, no matter how numerous the burnings, nor to select such portions of thoroughly calcined material as will be found after the second burning, has ever proved remunerative. The heap of matte must be treated as a whole, and the roastings continued until the desired grade of desulphurization is reached.

The process just described is seldom an advantageous one, as, aside from the production of the vilest fumes known to metallurgy, the value of the material operated on is too great to admit of being locked up for thirty days or more, or to warrant the loss that necessarily results from such frequent handling in the open air. The last difficulty may be partially obviated by erecting a light structure to protect the heaps from the rain and wind; but at best, the practice is an imperfect and objectionable one, and only to be recommended in new, outlying districts where an expensive calcining plant can not at once be erected, and where the climate is favorable for out-of-door operations. The expense of crushing and calcining in furnaces is scarcely greater than the three or four burnings necessary to produce the same result; but the condition of the roasted material is so much more favorable for the succeeding smelting process, in the case of heap roasting, that this reason alone is often sufficient to outweigh all objections that can be offered.

The practice of spalling the large pieces of matte upon the heap itself must be deprecated, as it has a strong tendency to solidify the structure and render the draught weak and irregular.

The cost of this process, based upon the roasting of many thousand tons of matte, and divested of those details that too closely resemble the heap roasting of ore to warrant repetition, is as follows, assuming the daily amount of fresh matte subjected to this treatment to average thirty tons:

COST PER TON OF MATTE.

First Fire.	
Breaking	$0.35
Transportation to heap	0.15
Fuel—allowing 3 cords of wood to 60 tons of matte	0.25
Constructing heap and burning	0.32
Total	$1.07
Second Fire.	
Fuel—same as before with addition of chips	$0.30
Turning heap and burning	0.40
Total	$0.70
Third Fire.	
Fuel—same as second fire	$0.30
Removing finished heap	0.40
Transportation to furnace and expense of preparing the raw matte still remaining, which results from the fused matte	0.45
Total	$1.15
Total cost of three burnings	$2.92

Chief of the United States Geological Survey.—It is reported that Major J. W. Powell, Chief of the United States Geological Survey, will be superseded by Prof. Raphael Pumpelly, of Newport, Rhode Island, who is now a member of the survey.

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FURNACE, MILL, AND FACTORY.

We notice that the well-known New York house of H. R. Worthington made the lowest bid for furnishing to the Montreal Water Commissioners an 8,000,000-gallon pumping-engine, their price being $37,500. It is said that by a recently invented addition, the Worthington duplex compound engine has been so improved that the manufacturers can now guarantee a much higher duty than ever before. This would make the Worthington a still more dangerous competitor of the Cornish engine, the high duty of which has always been its chief recommendation, overbalancing in many cases the consideration of expensive installation.

The South Tredegar Nail-Works, of Chattanooga, Tenn., began June 8th to manufacture steel nails, and will produce one thousand kegs a day.

The puddling department of the rolling-mill at Cumberland, Md., is in operation, and the bar mill was expected to start June 10th.

The Pittsburg Steel Casting Company has made improvements in the manufacture of refined Bessemer steel castings, by which it is enabled to reduce the price of heavy plain castings to five cents a pound.

The Harrison Wire Company, of St. Louis, has bought eight acres of land on the right bank of the Monongahela River, eight or nine miles above Pittsburg, Pa., and will move its works there from St. Louis.

At the Fifteenth street mill of Oliver Brothers & Co., at Pittsburg, a new cupola has been erected that will increase the capacity of the Clapp-Griffiths process at these works. It is of equal size with the one now in use. The steel mill will run all summer.

The Ansonia Brass and Copper Company, of Ansonia, Conn., has procured the exclusive right in a newly patented mold for casting copper ingots. The mold is composed of two parts, the edges of which are made to interlock, as usual, with the exception that the edges of the metal, instead of coming together parallel with each other, are beveled backwardly. Thus the inner edges only of the mold sections come together, like two knife-edges. The beveled edges are luted with a putty of china clay, and the interior surface is painted over with china clay mixed with oil and dusted with pulverized charcoal. The gate at the top of the mold is of the ordinary character, and at one side there is an overflow opening. The clay is impervious to the melted copper, and contracts as the carbon burns out; hence the core shells out of the casting easily when the ingot is cold. When the copper is poured in, the surplus runs off by the overflow, and the pouring is continued until the ingot has partially cooled at the lower end. This is said to prevent the ingot from being suspended by the gate, and allows the ingot to contract in the mold, so that it remains solid and free from cracks and imperfections.

The plant of the Mount Hickory Iron Company's works, at Sharon, Ohio, was sold at public sale, and bid in by P. L. Kimberly for $27,500, an amount supposed to represent about one fourth the value of the plant.

The Dayton Screw-Works, at Dayton, Ohio, were sold June 3d to the New Britain (Conn.) Company. The working capital of the new concern is $300,000. Machinery will be added so as to largely increase the production. Mr. A. J. Wheeler, of New York, is president of the new organization; H. E. Russell, Jr., of New Britain, treasurer; and William P. Smyth, of New York, agent.

The iron manufacturers of Youngstown, Ohio, have decided to go into the steel business extensively, and are altering their plant for the purpose.

The Phosphor-Bronze Smelting Company, Limited, of Philadelphia, has issued a new price-list, which came into operation on the 1st instant.

The contracts for supplying the Indians with steel, iron, heavy and shelf hardware, mechanics' and machinists' tools were awarded to S. D. Kimbart & Co. and S. H. Crane, of this city.

The Harrison Wire-Works plant at St. Louis, Mo., was sold June 11th by a special commissioner. George F. Crane and James Cummiskey bought in the property for $30,000, subject to a mortgage for $150,000.

William H. Harris, proprietor of Harris's Iron-Works, at Buffalo, New York, assigned June 10th. No schedule was filed, but preferences foot up to about $20,000.

The blast-furnace at Fond du Lac, Wis., has started up. The improvements recently made give the furnace a producing capacity of about forty tons of iron a day.

LABOR AND WAGES.

The Iron-Workers' strike continues. A number of mills have started up with non-union men, and a few have signed the scale.

TRANSPORTATION NOTES.

The Pennsylvania creditors of the Shenango & Allegheny Railroad will make application in the United States Circuit Court at Pittsburg to restrain the English creditors of the company from selling the road at private sale.

An action has been begun in the Superior Court by Ralph Bagaley, of Pittsburg, against the South Pennsylvania Railroad Company, commonly known as the Vanderbilt road. The plaintiff, who is a subscriber to the amount of $1,000,000, of which he has paid in $220,000, asks the court to relieve him of his obligations, by reason of the violation and alteration of the contract by the defendants, and to dissolve the association of subscribers, wind up its affairs, and perpetually enjoin the defendants from proceeding further under the original agreement. The plaintiff also asks for the appointment of a receiver, to carry the judgment of the court into effect. Judge Sedgwick refused to grant a preliminary injunction, and set the case down for a hearing on Tuesday, June 16th.

The Tennessee Coal, Iron, and Railroad Company during May received directly from the mines 10,757 tons of coal and 7273 tons of coke; total from January 1st, 67,590 tons of coal, and 40,903 tons of coke.

COAL TRADE NOTES.

ENGLAND.

The entombed miners in the Philadelphia Colliery, near Durham, were reached by the exploring parties June 7th, but all (thirteen) were found dead.

The verdict of the jury who considered the case of the Usworth English colliery explosion, whereby forty men and boys were killed early in the present year, is probably the first expression of opinion from a public body of this class to the effect that coal-dust and a small percentage of fire-damp can play the part that has hitherto been usually ascribed to fire-damp alone. They found that the explosion was caused by a shot, the fire of which acted upon "the coal-dust and a small percentage of gas."

MISSOURI.

Mine Inspector Wolfe has tendered his resignation, and a successor for the unexpired term will probably be appointed from among the miners of the Rich Hill District.

The mine of Loomis & Snively, at Beaver, has been blown up with dynamite. The underground passage was destroyed and the supports torn away. It is supposed that a can of dynamite was introduced by some of the striking miners into the body of the mine by means of an outer air-shaft. The mine was some time ago inclosed with a high palisade, and colored men have been on guard all of the time fully armed. The miners were not at work at the time of the explosion.

OHIO.

Reports from Chapman state that Willow mine, No. 6, is still idle, as the new trestle and chutes are not finished. Sippo mine is idle for want of sale. There is no demand for coal. The Blaine shaft has worked about half-time the past month. The Youngstown Coal Company has got down its air-shaft, and the work will be pushed ahead now with a full force.

The Raccoon mines (old Leadville shaft), at Weathersfield, are draining.

PENNSYLVANIA.

ANTHRACITE.

A large body of water in chamber No. 3 of the mine (Eckley colliery) operated by J. Leisenring & Co., at Eckley, was accidentally tapped June 6th, and the water rushed into chamber No. 2 through the opening before it was stopped, and covered the pumps and other machinery. No one was injured, and it is thought no further damage will be done. The accident causes a suspension of mining for some time.

It is reported that W. G. Payne & Co. have secured an adjoining lease of coal lands near their East Boston colliery.

Mine Inspector Gay last week ordered the closing of Beechwood colliery until a second outlet is made. This is already in process, an outlet through the Skidmore vein having been begun recently. Until it is finished, no shipments will be made. At present, there is but one outlet, and in case of accident on the slope, the miners would be imprisoned. A delegation of miners have asked the inspector to revoke his order, as they consider the colliery safe and their families depend upon it for a living. They were referred to the courts.

The North Ashland colliery, at Ashland, where a cave-in took place a few weeks ago, resumed operations June 8th.

Preston colliery, No. 2, at Girardville, after a week's suspension, caused by fire, resumed June 8th.

BITUMINOUS.

Mr. John Whitehead has purchased about 6000 acres of coal and timber land in Jefferson County. Several veins of coal have already been opened.

In the recent examination, only one of the twenty-five applicants for the position of mine inspector in the bituminous region obtained the necessary grade, 90 per cent. The successful man was Mr. Thomas K. Adams, of the Third District. As the matter stands, with but one man passing the examination, and with six inspectors to elect, the mine commission is at a loss to know how to proceed. It will recommend the inserting of a clause in the law reducing the necessary grade to 70 per cent. Unless this is done, it will be necessary to hold another examination. The commission says that it can recommend enough of the men for the positions, from the list, to fill them properly. The report of the commission has been sent to the governor.

UTAH.

The Home Coal Company, after having been shut down two months, has resumed operations.

GAS AND PETROLEUM NOTES.

Exports of refined, crude, and naphtha from the following ports from January 1st to June 6th:

	1885. Gallons.	1884. Gallons.
From Boston	2,759,741	2,539,531
Philadelphia	52,439,714	29,259,839
Baltimore	4,151,286	4,313,324
New York	150,304,991	149,600,289
Total exports	209,655,732	185,719,983

PENNSYLVANIA.

Messrs. Lindsay & McCutcheon, of the Star Rolling-Mill of Alleghany, Pa., have had 21 of their furnaces remodeled for the use of natural gas.

The Alleghany Heating Company agreed, when it received the right of way through Alleghany City, to furnish the City Hall with natural gas free of cost as soon as its pipes were laid in the streets around the building. No pipes have been thus laid.

The test of using natural gas at the Alleghany Water-Works, made recently, is said to have been highly successful. By its use, a saving of about $6 a day, and the wages of two firemen at $120 a month, can be made.

Arrangements are making to torpedo Jones & Laughlin's first natural gas venture on Twenty-sixth street, Pittsburg. The Thirtieth street well has discharged considerable gas since it was agitated, and it is thought that the flow can be increased in the old well in this manner.

The increase in the use of natural gas has forced the Fuel Gas Company to make additional arrangements for the supply of its customers. Work has begun in the construction of through lines to the wells at Murraysville, which are now producing more gas than the present pipeage will conduct to Pittsburg.

GENERAL MINING NEWS.

ARIZONA.

PIMA COUNTY—QUIJOTOA DISTRICT.

The secretary of the Peer, Peerless, and Crocker mining companies reports that the Crocker north drift is in 813 feet. As soon as connection is made with the winze, it will afford good ventilation, and cross-cutting will begin. Crocker tunnel No. 6 is in 109 feet. The face of the tunnel is in a very favorable formation, showing some spots of ore. The north drift from the winze to connect with the south drift from tunnel No. 2 is in 33 feet. Every thing will be in readiness to resume work in the south drift from this tunnel to connect with the same. This drift will be utilized to handle all the ore north of the winze from the 150-foot level up. Excavations for the ore-bin at the Peerless tunnel No. 1 have been completed. Car

penters are busily engaged putting in the tramway to convey ore to the mill. The main building and the mill are nearly completed. The water-pipe is all laid from the well shaft in the valley to the mill. Tank stations are cutting preparatory to putting in pumps.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED.—Official advices state that the new level (1410 feet) is in about 70 feet. A drift has been run east, cross-cutting the vein. This drift is now in 13½ feet, with quartz still east. The gold is coarse, and the quartz all good. This level is opening up big.

MARIPOSA COUNTY

LONDON.—This company's property is about three miles north of Hornitos. About two months ago, work was begun on the mine. The shaft has been sunk in the ledge to a depth of about 110 feet, which has developed a paying ledge fully five feet thick. On the surface, several new and substantial buildings are completed, including a building for one of the Wiswell improved mills, capable of crushing and amalgamating at least twenty tons of ore a day, and other machinery such as engine, boiler, hoisting-works, etc., costing about $18,000.

MONO COUNTY—BODIE DISTRICT.

Reports for the week ended June 1st:

BULWER CONSOLIDATED.—The official report shows that the east cross-cut, 200-foot level, is out 37 feet. Progress for the week, 18 feet. The rock in the face is extremely hard, and is probably the casing of the vein. The uprise has been advanced 21 feet; total, 122 feet.

CONSOLIDATED PACIFIC.—Since the last report, the drift to cut Pacific ledge No. 2 has been advanced 7 feet, and a small vein of about 7 inches has been cut. Every thing in and about the mine is looking well.

STANDARD CONSOLIDATED.—The mill started up June 1st, and is working satisfactorily.

PLACER COUNTY.

MAYFLOWER GRAVEL.—The company has struck a paying lead eight feet wide, of very coarse gold that averages $19 a ton.

PLUMAS COUNTY—GREENVILLE DISTRICT.

FOREST KING.—Work in the mine continues with regularity. Pay ore is taken out and sent to the Arcadia mill.

GREEN MOUNTAIN.—The uprise in the Sulphuret chute has reached a distance of 90 feet. The air is not sufficient to run the drills and supply the uprise. The tunnel, therefore, is pushed ahead by the use of hand-drills. Work on it will so continue till the uprise connects with tunnel No. 5. Stoping in the Sulphuret chute continues, and the ore is sent to the mill. There has been some trouble in consequence of a large amount of water to contend with, but it is becoming less, and the trouble will cease entirely by the end of two weeks. The mill is running regularly, and good work is done.

SAN BERNARDINO COUNTY.

BELLE MCGILROY.—A connection has been made that opens up a large body of high-grade ore. The ore in sight makes the claim very valuable. Large bodies of ore can now be stoped at small cost.

KING.—On or about the 1st of the month, the stopes were to be discontinued and the force reduced by nearly one half, to permit the shipment and reduction of the ore-dump. Until it is entirely disposed of, no ore will be broken in the mine, and prospecting the lower levels will be carried on more vigorously than ever. The ore-bodies recently encountered there indicate larger chambers as depth increases.

SAN DIEGO COUNTY.

RAVITT.—It is reported that John W. Mackay has bonded this gold mine in the Cargo Muchacho District, near the line of the Southern Pacific Railroad.

SANTA CLARA COUNTY.

QUICKSILVER.—The statement for June 1st shows:

Cash on hand and in bank.....	$30,165.97
Quicksilver on hand, valued at..... ..	197,952.00
Unpaid pay-rolls.....	10,700.00

May production, 2000 flasks. May sales, 2476 flasks.

COLORADO.

ASHWORTH GOLD MILLING COMPANY.—Articles of incorporation have been filed. Capital stock, $10,000. Business will be carried on in Rio Grande, Conejos, La Plata, and San Juan counties. The office will be in Denver. The trustees for the first year are James Ashworth, John K. Robinson, and Thomas H. Downs.

WHITEHILL GOLD AND SILVER MINING COMPANY.—Articles of incorporation have been filed. Capital stock, $300,000. Business will be carried on in Colorado, with the principal office in Boston, Mass. James C. Whitehill is the authorized agent for Colorado, with his office at Leadville. The incorporators are C. R. Tucker, Jr., F. W. Bryant, C. B. Kenfield, E. A. Freeman, George Armstrong, W. Armstrong, and Henry Lent.

CHAFFEE COUNTY.

GLADSTONE.—The cross-cut, now over 1100 feet, is vigorously pushed. The vein cut at 1000 feet proves to be about three feet wide, of rather low grade. It has not been prospected to any extent, but samples of the ore have been sent to Leadville to be tested.

HIDDEN TREASURE.—Work has been resumed.

LAREDO.—This tunnel in North Cottonwood is in 150 feet, the last 20 feet being on a spur of the main vein. It shows about six inches of solid mineral, the average value of which is 75 ounces.

STONEWALL.—Mr. Reed, the custodian of this property, near Hancock, has recently obtained judgment against the company for over $1800, and it will probably be sold to satisfy the claim. In that event, a new syndicate may be induced to take hold of the property and resume work.

CLEAR CREEK COUNTY.

The Frank Osbiston smelter was to blow in this week. It is patterned after the Freeland smelter, with several serviceable improvements. Colonel Osbiston has secured the services of Captain Vivian as smelter.

Reports dated June 5th show the following transfer: E. Stearns *et al.* to Kitty Clyde Company, Kitty Clyde Lode, Coral Mining District; $55,000.

PAY ROCK.—The concentrating-works, which have been undergoing repairs, have started up. They will run steadily until cold weather.

CUSTER COUNTY.

BASSICK.—Reports dated June 2d state that the mine is worked at the 1200-foot level. The crude mineral is only taken out and stored underground for security. The men are divided into three shifts, and about sixty are employed. No work is prosecuted in the new shaft, nor is the concentrator running. It is hoped that enough high-grade material can be secured to cover the wages account. Liens have been taken out against the property to the amount of the total indebtedness. The miners that are employed, as well as the idle ones, are orderly and very patient under their misfortunes.

BULL-DOMINGO.—Work is about to begin. The air-compressor has arrived.

IMMORTAL.—The mine is under investigation by a syndicate of English capitalists with the view of purchasing.

JULIANNA.—The company, by unfortunate management, says the Rosita *Journal*, has been ruined. Unable to meet its obligations, it has, by a large majority vote of its stockholders, closed up, and the final papers for its dissolution have been granted. This totally wipes out the Julianna Lode Mining Company. But by special effort of some of the late directors of the Julianna Company, and by sacrifices on their part, an agreement has been made by which every stockholder who has ever put a dollar into the Julianna Company will be taken care of with stock in the Security Mining and Milling Company.

SECURITY.—The drill has started running with a capacity of about thirty tons a day, and is reported to be doing good work upon the old Leavenworth dump. The company is doing custom work, and pays the highest market price for all ores.

GILPIN COUNTY.

KANSAS.—Parties have leased a portion of this mine west of the English Kansas Company's property, and have begun cleaning out a shaft sunk several years ago, which they will use as a main shaft.

KING GOLD AND SILVER MINING COMPANY.—A meeting was recently held at Boston, Mass., and a reorganization effected. The company is said to be on a much better financial basis than formerly, and will immediately resume work on the King mine, on King Flats, upon the return of Mr. Hale, the superintendent.

LAKE COUNTY.

From the Leadville *Herald* we condense the following:

A meeting of railroad officials and parties interested in the Leadville smelting-works has been held at Denver.

For some time past, parties have been at work to effect a consolidation of the Jessie Clark, Australian, Little Winnie, and Virginius mines, on Little Ella Hill. The properties are all good ones, and some of them have produced largely. The great drawback to these mines, in the past, has been litigation, resulting from conflicting interests, and a large portion of the time they could not be worked, owing to injuctions issued by the courts, pending interminable lawsuits. The efforts to consolidate the properties, it is understood, are meeting with good success.

ARGENT.—The Vining, Chieftain, and Baltimore lodes, the property of this company, have been levied upon by the sheriff. The levy was made to secure $6626.19 due John Harney, and another $2752.22 due Hon. C. S. Thomas, of Denver, and Charles H. Graham, of Philadelphia.

CHRYSOLITE.—Several more jigs are to be added to the concentrating plant.

EVENING STAR.—Some very fair argentiferous iron ore has lately been shipped from this mine.

HUMBOLDT CONSOLIDATED.—Mr. C. L. Hill has made an examination of this company's property on Carbonate Hill. The examination was made for some of the larger stockholders in Boston, and if favorable, they will provide $25,000 with which thoroughly to prospect the property.

IRON HILL CONSOLIDATED.—The American Mining and Smelting Company, lessees of the Iron Hill Consolidated mines, have let a contract for the sinking of the Imes shaft an additional depth of 200 feet. This will make the shaft the deepest in the district.

IRON SILVER.—The building for the test mill is completed, but no machinery has so far been provided. The building will be occupied by five or more different kinds of jigs or ore-washing machines, and thorough tests made to determine the merits of the various machines and their adaptability to the treatment of the ores.

MIKE & STARR.—It is stated that some of the owners will supply the money necessary to resume work on this property.

PITKIN COUNTY.

At the Aspen smelter, two furnaces are in blast, and the establishment is turning out from seven to eight tons of bullion a day. The bullion is all of very high grade, and the smelting company, it is estimated, has about $180,000 worth of bullion on hand and in transit.

The product of the Aspen mines is far in excess of the markets, and the accumulation of ore is estimated by a competent authority at from 12,000 to 15,000 tons, which is stored in ore-bins, underground workings, and other available places, awaiting sale and shipment.

The road from St. Elmo to Aspen will soon be completed, when the productive mines look for some relief. St. Elmo will, however, be available as a shipping point only for ores going to Denver, and the people are anxiously waiting for a passable road to Leadville for the shipment of their ores.

Messrs. William B. Page, Theodore F. Van Wagenen, and D. G. Miller, of Leadville, have made an examination of the Durant and adjoining claims at Aspen. The report will be presented to the district court as testimony in the contest between the Durant and Washington No. 2 properties. The temporary injunction restraining the Durant from continuing the sinking of the incline was to be heard the 6th of June.

DULUTH.—There are several tunnels and open cuts on the vein, which is well defined and five feet in width, filled with spar and iron, with occasional pockets of gray copper and copper sulphide that carries a fair amount of silver.

FINLAND.—This mine, owned by a company of the same name, has a vein three feet wide, with walls of blue lime. Some good pockets of ore have been extracted that has been of a high grade. A tunnel and shaft comprise the development-work.

LA SALLE.—A contract is to be let to sink a shaft 100 feet deep.

UNEXPECTED.—There have been no shipments, because there is no road to afford transportation; but now a saw-mill has been erected within a mile and a half of the mine, and a road has been built within a few rods of the dump.

SAN JUAN COUNTY.

LONDON & SILVERTON.—Mr. I. Garland has been appointed manager of this company. Work will soon be resumed on a large scale.

NORTH STAR.—The body of gray copper ore

recently discovered has widened and improved in quality.

SAMPSON.—A great deal of dead-work is doing, which accounts for the falling off in the product the last month. Nothing but the quartz mined in doing this dead-work is run through the mill, the rich ore-body being left untouched.

DAKOTA.

LAWRENCE COUNTY.

FATHER DE SMET.—The official report for the week ended June 1st shows ore extracted from first, second, and third levels, 3000 tons. Ore milled, 3000 tons. East cross-cut, fourth level, advanced 14 feet on company's account. Total length, 129 feet.

GEORGIA.

CARROLL COUNTY.

FALLS CITY & GEORGIA.—This company has started its mill. The company owns 202½ acres of land about one mile from Villa Rica, on the Georgia Pacific Railroad, of which 62½ acres are mineral land, through which runs a fine gold-bearing quartz vein from 12 to 15 feet wide. The machinery consists of a 25 horse-power engine and 30 horse-power boiler, and a crusher and 10-stamp mill of a capacity of from 20 to 24 tons, made by J. Wilkes, of Charlotte, N. C.; also two of Imlay's concentrating tables, and one of Clark's patent amalgamating machines. The double-compartment shaft is down 60 feet. The men have struck two feet of the vein in the bottom of the shaft that mills $10 a ton. The water being somewhat troublesome, the company has one of the Hooker-Colville steam sinking-pumps, which discharges 8000 gallons water an hour.

IDAHO.

HORN-SILVER.—It is stated that the price asked for the property is $275,000. Negotiations for the sale are pending.

MODOC CHIEF.—A vein of solid galena ore at least one foot in thickness has been struck.

MEXICO.

A dispatch to the *News* from Zacatecas, says that an explosion of 500 cases of giant powder, June 11th, in the Santo Tiburcio de Laveta Grande mine, killed ten men, injured as many more, and completely wrecked the mine.

From the Mexican *Financier*, we condense the following:

Silver and lead mines have been discovered and denounced in Sultepec and Tamascaltepec, in the State of Mexico.

Two new gold mines in the State of Mexico have been named the Malinche and the Conquistador, and capital is sought in the City of Mexico to work them on a large scale.

The mint at San Luis Potosi continues to receive a great deal of silver from the Catorce mine. Of 213 barras recently received, the greater part came from this mine.

The interest of miners in the new silver discoveries in the Sierra del Carmen, State of Coahuila, continues unabated.

By an official decree of the State of Mexico, a scientific mining commission is established, to be composed of mining engineers. The commission is to study the working of mines, all processes for the reduction of ores, the situation, present state, importance, and prospects of all ore-deposits now known, with the view of gathering the mineral statistics of the State. As soon as the examination of any district is finished, the commission is to make a full report to the State government. Mineralogical, geological, and paleontological collections are to be formed for the use of the students of the Literary Institute and for the information of practical miners. The sum of $10,000 is appropriated for the expenses of the commission.

CUSIHUIRIACHIC.—The new mill at the mines is in successful operation. It crushed and roasted during the last week of May 256 tons, and it is estimated that the monthly product will average about 1000 tons. There is a large amount of ore on the dump, and sufficient broken down in the mines for several months' consumption. Mr. James D. Hague, who examined and reported upon these properties in December, 1882, has lately made a short visit to them again, and the following extracts have been made from an informal report, just received by the company: Without attempting detailed description, I may say that the general appearance of the ground is very favorable. The vein is large and strong, frequently from 8 to 10 feet wide, and carrying a liberal distribution of good mineral through it. Some of the stopes were looking extremely well. Much of the ore thus stoped has been raised to the surface, and a considerable stock of ore is still lying broken in the mine, ready for extraction when wanted. The amount of this last-named reserve is estimated as good for 2000 tons of milling ore, after assorting. Judging from what is visible, I should think this a reasonable estimate. From present indications, the ground now opened and accessible may reasonably be expected to furnish an ample supply of ore for the full demands of the mill for many months, including the ore already on hand, besides the promise of continued supply as the developments are extended in length and depth. The mill had been in operation two or three weeks at the time of my visit; and, while not yet entirely adjusted to regular duty, was doing well, and promised to be very satisfactory. It seems generally very well planned and well constructed, and supplied with machinery of first-class character in every respect, only requiring economical management to pay reasonably well.

MICHIGAN.

Reports state that at Manistee a bed of solid salt, thirty-four feet thick, has been struck at a depth of 2027 feet.

COPPER MINES.

Output of the mines mentioned for May, together with comparisons with the outputs of the same mines in May, 1884, and May, 1883:

Mines.	May, 1885. Tons.	May, 1884. Tons.	May, 1883. Tons.
Calumet & Hecla	2547	2265	1838
Quincy	250	265	261
Atlantic	215	192	162
Franklin	190	176	170
Huron	115	70	...
Copper Falls	65	....	....

For the first five months of the calendar year, the aggregate outputs of four of these mines have been as follows:

	From Jan. 1, 1885. Tons.	From Jan. 1, 1884 Tons.
Calumet & Hecla	11,719	10,203
Quincy	1,022	1,080
Franklin	922	877
Huron	560	358

Huron, February, 1885, not reported, but estimated, in above total.

GRAND PORTAGE.—Houghton parties are trying to lease this mine to work on tribute.

NATIONAL VS. MINESOTA.—The case of trespass of the National Mining Company *vs.* the Minesota Mining Company, which the former won in the Circuit Court, was appealed to the State Supreme Court. Information just received states that the decision had been reversed, the Supreme Court holding that the statute of limitation was a bar to the action.

IRON MINES.

The following statement, published by the Marquette *Mining Journal*, shows the amount of iron ore and pig-iron shipped from the lake ports of that district for the season, up to and including Wednesday, June 3d:

	Gross tons.
Marquette	70,692
Pig-iron	200
L'Anse	3,693
St. Ignace	14,501
Pig-iron	115
Escanaba, Marquette District	59,942
Menominee District	93,112

IRON CLIFF.—A large force is working at the A and B shafts of the Barnum mine. The showing is said to be good.

LAKE SUPERIOR.—The company is sending out a fine lot of hematite ore from its mine stock-pile, and is in shape to load much more rapidly than heretofore.

MONTANA.

JEFFERSON COUNTY.

MINACH.—This mine has been sold to Messrs. C. D. McClure and A. Lambeth, for $25,000. The mine is a mile and a half northeast from the Wickes smelter, and it is but partially developed. There are three shafts sunk upon the lead, being respectively 100, 90, and 65 feet deep. It is the intention of the purchasers to begin work in thirty days on the mine. Their first effort will be directed toward running a 2200-foot tunnel, to tap the vein at a depth of 500 feet. They will also erect a furnace at the mine for the reduction of the ore, unless they can have it smelted at the Wickes works to better advantage.

LEWIS & CLARKE COUNTY.

Mr. A. M. Esler will soon have a complete sampling and concentrating mill, costing about $15,000, erected near the railroad in Helena, and, if sufficient inducement is in sight, will add amalgamating and smelting-works in time.

Parties interested in the erection of reduction-works will organize a company with a capital stock of $100,000. One half of the working capital has already been pledged. Reports show, it is said, that the reduction-works and a ten-stamp mill and concentrator can be constructed within sixty days.

The outlook of the Helena District, which is situated a few miles west of Helena, is said to be good. The Helena, Good Luck, Christmas Gift, Cabinet, and Grass Valley mines have shafts ranging from 90 to110 feet deep. The Helena lode is the most thoroughly worked, the shaft being down 110 feet, and ore on the dump in the neighborhood of 150 tons. The Helena and Christmas Gift lodes are the only ones now worked.

SILVER BOW COUNTY.

During April and May, fourteen new placer locations, embracing 591¾ acres of ground, were recorded in this county.

GOLDSMITH.—The mine is said to have been sold for $55,000.

MABLE.—Shipments of twenty-five tons of $100 ore are reported.

MONTANA.—It is said that the company will soon be ready to buy silver ores.

NEVADA.

EUREKA COUNTY.

ALBION CONSOLIDATED VS. RICHMOND.—The further hearing of the motion for a change of venue in this case was continued until Monday, July 6th.

EUREKA CONSOLIDATED.—Superintendent F. Robbins's reports for the week ended May 30th show that there were hoisted 56 cars of ore from tributers. Every thing throughout the mine remains about the same as reported last week. In the Williams pitch, they have altogether driven 80 feet on the dip of the ore, which is northeast and southwest, and have driven over 50 feet east and west in ore, with good prospects of its extending a great deal farther. Up to June 3d, three shipments of bullion had been made since the furnace started on May 19th. The value of this ore was over $25,000. The furnace is a perfect success, and another of the same capacity has been ordered.

LYON COUNTY.

Parties are canvassing the proposition of erecting a small gold mill on Walker River, near Wellington, to work rock in that vicinity.

STOREY COUNTY—COMSTOCK LODE.

The pay-rolls of the Comstock mines for May aggregated $115,000.

CHOLLAR.—West cross-cut No. 3, on the 3000 level, is out 29 feet, with the entire face in quartz carrying a fair percentage of mineral. The south lateral drift is advancing cautiously, to avoid suddenly tapping water, of which there are no present indications in the face.

CONSOLIDATED CALIFORNIA & VIRGINIA.—The report for the week ended May 30th states that there were extracted 632 tons of ore and shipped to the Morgan mill 684 tons 1110 pounds. The assay value of the ore milled during the week, per battery samples, was $15.47 a ton.

HALE & NORCROSS.—Reports dated June 4th show that west cross-cut No. 1, south of the main incline winze on the 3000 level of Norcross, has cut through 15 feet of good ore, and the face is still in quartz strongly mineralized. They will drift north along this ore-body, which swings sharply to the west. Some fine ore is on the dump at the Combination shaft, taken from west cross-cut No. 2, at the point where they are chambering out a winze station. The north lateral drift on the 3000 level is cutting through heavy blue clay, and has been swung slightly to the west of north, in which direction the vein is trending.

OVERMAN.—Two hundred tons of ore are shipped each week to the Vivian mill. This ore is obtained below the 200 or sage-brush level.

NEW MEXICO.

RIO ARRIBA COUNTY.

Mica has been found in the vicinity of Tres Piedras. There is an abundant growth of pine and other timber and plenty of water at the five claims. The Muscovite claim and four others show distinct veins of considerable width cropping out to the surface from ten to fifty feet, with mica in irregular blocks all over the surface. The veins run northeast and southwest. A ten-foot shaft has been put down on each claim. Samples have

been sent to New York, Chicago, and St. Louis, and pronounced to be of the best quality.

PENNSYLVANIA.

LEHIGH COUNTY.

J. D. Schreider and Stephen Nagle, of Allentown, have discovered a deposit of talcose slate on a farm in the northern part of Lehigh County. They have leased the property, and will develop it. This quality of slate is valuable because of its rarity, this being the first deposit that has been found in the county. The color of the slate is green and red, and the shades are about equally divided. It is utilized principally in the manufacture of mantels and table-tops, and for sharpening instruments.

NORTHAMPTON COUNTY.

At the weekly meeting of the National Slate Exchange, held at Easton, June 5th, the following sales were made: 1798 squares of blue block slate at $3.75 a square; 194 squares of No. 1 blue block ribboned slate at $3 a square; 200 squares of sea-green slate at $2.50 a square; 3000 feet of blackboard slate, and 21 squares of government slate, 12 by 24 by ⅛, each on private terms. The market is steady and quiet.

UTAH.

SALT LAKE COUNTY.

EMMA.—The new smoke-stacks have been erected at the works, which have been fired up, and it is expected the water will all be pumped out of the mine within a week after beginning operations. The force will be doubled as soon as the men can be sent into the workings.

WASHINGTON COUNTY—SILVER REEF DISTRICT.

CHRISTY.—The company has a five-stamp mill; but the ore being sandstone, it can put through the battery from 40 to 45 tons daily. The ore is free milling, and works up to from 80 to 85 per cent. The company has a large area of mining ground, but, until it is provided with more milling facilities, will leave it unworked. Were it not for the heavy discount on silver, the profits would be very satisfactory. As it is, it yields a fair return on the capital invested.

WYOMING.

The improvements to be made at the soda-works near Laramie, which are leased to Mr. Howard Hinckley, of Boston, will be extensive. The force has been increased, and, with the machine now building 150 tons can be taken out.

BULLION PRODUCTION FOR 1885—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of May.	Year from Jan. 1st, 1885.
		$	$
Adams, S. L.	Colo.	.....	146,103
Alice, G. S.	Mont.	.....	346,395
Belmont	Nev.	——	10,003
Boston & Montana, G.	Mont.	.....	139,624
Christy, S	Utah.	.....	82,623
Chrysolite, S	Colo.	4,326	17,465
Colorado Central, S.	Colo.	19,157	91,990
Consolidated Bobtail, G.	Colo.	.....	24,316
Deadwood-Terra, G	Dak.	.....	105,740
Derbec Blue Gravel, G. S.	Cal.	.....	50.057
Essex, G. S.	N. S.	.....	6,474
Eureka Consolidated, S L.	Nev.	——	10,266
Father de Smet, G.	Dak.	16,292	143,054
Freeland, G. S. C.	Colo.	.....	126,613
Grand Prize, S.	Nev.	——	25,150
Granite Mountain, S.	Mont.	.....	327,214
Hall-Anderson, G.	N. S.	.....	3,695
Head Center & Tranquillity	Ariz.	——	85,396
Hecla Consolidated, G. S. L. C.	Mont.	.....	*181,888
Helena, G. S. L. C.	Mont.	99,440	451,000
Homestake, G.	Dak.	.....	291,689
Hope, S.	Mont.	.....	51,143
Iron Silver, S. L.	Colo.	.....	251,167
Kentuck, S.	Nev.	†460	1,838
Lexington. G. S.	Mont.	.....	261,828
Moulton, S. G.	Mont.	.....	250,536
Mount Diablo, S	Nev.	.....	149,312
Navajo, S.	Nev.	——	82,894
New Hoover Hill, G. S.	N. C.	.....	23,141
New Pittsburg, S.	Colo.	——	9,594
North Belle Isle, S.	Nev.	——	2,118
Ontario, S	Utah.	.....	592,054
Oxford, G	N. S.	.....	1,905
Plymouth Consolidated, G	Cal.	81.927	410.951
Rooks, G.	Vt.	——	28,384
South Yuba, G.	Cal.	——	1,168
Standard Consolidated, G.	Cal.	.....	62,116
Stormont, S.	Utah.	.....	53.379
Tombstone, G. S. L.	Ariz.	*55,598	290,804
Total		.....	5,191,066

G., gold; S., silver; L., lead; C., copper. Silver valued by the different companies from $1@$1.29·29 per ounce; gold, $20.67. *Not including value of lead and copper. †Royalty. ‡Net. —— No shipments during month mentioned.

MARKETS.

NEW YORK, Friday Evening, June 12.

The iron trade is in a condition of lethargy, from which it appears almost impossible to arouse it. The fact that only 79 anthracite furnaces out of a total of 141, and only 94 bituminous furnaces out of 128, are in blast, or that less than half the furnace capacity is at work, seems to have no effect upon the pig-iron market, which remains as dull as it can possibly be with declining prices. One half the steel rail mills are closed, and yet, beyond a greater firmness in holding to the present low quotation of $27 a ton at the mills, the closing of the mills has no effect on the general market.

The great strike of iron-workers at the Pittsburg and other Western mills has almost stopped the production of sheets, bars, nails, etc., and yet the market remains unchanged for these products. The anthracite mines are working on a restricted output, probably not much more than two thirds of their capacity, and yet the prices are declining and the market dull to stagnation. And yet the market is not overstocked, and consumers and dealers are carrying lighter stocks than at any previous time in years. There is practically no speculation, and the banks are overflowing with money that they can not lend at 1½ per cent per annum, for no one seems disposed to use it in any of the ordinary channels of business.

The impression appears to be general that for the next two months business will continue very quiet, but the conviction is almost as general that the autumn will bring improvement in nearly every branch of business. Unquestionably, the statistical position in coal, iron, steel, copper, and some other articles, is more than usually satisfactory, and presents almost all the conditions essential to an active market.

Silver.

The London market has been steady, with a slight advance yesterday, as shown in the following table:

DATE.	London. Pence.	N. Y. Cents	DATE	London. Pence.	N.Y. Cts.
June 6	49⅛	107	June 10	49⅛	107
8	49⅛	107	11	49 3-16	107⅛
9	49⅛	107	12	49¼	107⅛

There is nothing of note. Mr. Warner's proposed silver legislation has not yet been put into definite shape. As at present formulated, it simply makes the United States government a warehouse, making or losing by the rise or fall in the market price of silver, just as it would did it receive lead, copper, or pig-iron on deposit. Nothing short of an agreement among civilized countries on a ratio between gold and silver, at which the two metals will have universal course can bring any stability into this question. As formulated, Mr. Warner's plans have no chance of acceptance.

United States Assay-Office at New York.—Statement of business for the month ended May 29th, 1885:

Deposits of Gold.

Foreign coin	$705,000	
Foreign bullion	75,000	
United States bullion	370,000	
United States bullion (re-deposits)	100,000	
Jewelers' bars	80,000	
Refined gold	123,000—	$1,473,000

Deposits of Silver.

Jewelers' bars	$23,000	
Foreign coin	96,000	
United States coin	23,000	
Foreign bullion	66,400	
United States bullion (contained in gold)	7,300	
United States bullion, re-deposits	13,400	
Arizona	1,200	
Colorado	400	
Dakota	7,800	
Idaho	1,400	
Lake Superior	1,400	
Montana	121,000	
New Mexico	24,500	
Utah	2,800	
Refined silver	82,500—	365,000
Total deposits		$1,838,000
Gold bars stamped	$1,044,889	
Silver bars stamped	659,410—	1,704,300

New Superintendent of the Philadelphia Mint.—Daniel M. Fox, ex-Mayor of Philadelphia, has been appointed Superintendent of the United States Mint at Philadelphia, to succeed Colonel Snowden.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, June 11th, made no change in the bank's minimum rate of discount, and it remains at 2 per cent. During the week, the bank gained £431,000 bullion; and the proportion of its reserve to its liabilities was raised from 50½ to 51 1/16, against 46⅞ per cent at this date last year. The weekly statement of the Bank of France shows gains of 28,862,000 francs gold and 1,123,000 francs silver. Bar silver was 1/16d. higher at 49 3/16d. per ounce.

Copper.—The copper market has been quite dull during the week, and prices have declined somewhat. Lake may be quoted at 11·35@11·50c.; Orford, 10¾@11c.; Baltimore, 10·60c.; Electrolytic, 10½@11c., nominal.

The statistical position of the metal continues favorable for better prices later in the season, though, as stated in these reports, this market will probably be dull for the next month or two.

The announcement made two weeks ago that the Anaconda had closed half (13) of its furnaces, was calculated to strengthen the market and benefit the Anaconda as well as other producers. One of the Butte, Montana, papers, in its accustomed strain, denounces the report as untrue. We have received it from well-informed sources, and in a private letter dated Butte, Mont., June 5th, it is stated that "the Anaconda has *ten* furnaces running," instead of thirteen, as reported. No doubt, had we been misled, the company would have promptly corrected the report.

We are very far from bearing any ill-will to either the Anaconda or any other Montana mine. On the contrary, it gives us great pleasure to state that all recent reports we have received concerning that great property are unanimous in its commendation; that it has a vast amount of ore; and that its works are magnificent, well arranged, and economically managed. Stopping half or more than half its output would be a wise course, and would undoubtedly benefit the market, while, at the present price, the company can have little or no advantage in continuing to flood the market, whether foreign or domestic, with copper. The Calumet & Hecla is reported in our Boston correspondence to have increased its production even beyond expectation, and is evidently forcing the market backward, both by its production and sales. During the first five months of this year, its output is said to have been 23,440,000 pounds of copper (? "mineral"), against 21,660,000 pounds for the same time in 1884. At the present rate, if the figures represent, as they state, "copper," the production this year will amount to between 56 and 58 million pounds.

In London, Chili Bars have varied as follows: June 6th and 8th, £45 7s. 6d.; 9th, £44 15s.; 10th, £44 12s. 6d.; 11th, £44 10s.; and to-day, £44 12s. 6d. Best Selected has remained steady at £49.

Tin.—The London market has been cornered, and the price has varied from £89 12s. 6d. on June 6th to £89 on the 10th, suddenly jumping, on the 11th, to £92 15s., and to-day is quoted by cable to the Metal Exchange £93 5s., and it is quite possible it may go higher. In this market, prices have fluctuated in sympathy, and now stand at 19·80@19·90c. for spot and July, and 21 cents asked. Sales of 5 tons at 19·80c. and 20 tons at 19·90c. of July tin were made at the Metal Exchange to-day.

Lead.—The sales in this market scarcely exceed 100 tons, at 3·60@3·65c. The market is dull. It is reported that several of the lead smelters and the great lead speculators are arranging a new combination to hold their lead for a rise. Though the matter has reached the stage of negotiation, very little confidence is expressed in its reality and still less in its success should it be organized. Soft Spanish in London to-day was £10 17s. 6d.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

Business gradually revives, with a moderate demand at unaltered quotations. It appears to be generally conceded that the market has touched bottom. The event of the week has been the sale of 500 tons of Refined and 200 tons of Chemical for both home consumption and Eastern shipments, on the basis of 3·45c. Refined for the moment will not bring more than Common.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

Market quiet and dull, prices unchanged. Refined and Corroding, 3·50c. Sales for the week sum up over 300 tons Corroding, June and July. Common may be quoted at 3·47½c.

Spelter.—This market has again declined, and we hear of sales of Illinois at 4·10c. We quote 4·10@

4·30c. Domestic, according to brand. Silesian is still quoted at 4¾c., nominal. In London, Silesian is quoted £13 7s. 6d. to-day.

Sheet-Zinc.—We quote at 4·90@5c. for Domestic.

Antimony.—We continue to quote here at 9½c. for Hallett's, which to-day in London was quoted £38. The market here is exceedingly dull.

Nickel.—In small lots, we quote at 70@72c. for Domestic (Wharton's) or Foreign.

Bismuth.—Worth from $2@$2.25 a pound.

Aluminium.—90c. to $1 an ounce.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 12.

American Pig.—The report of the pig-iron market might be "kept standing," and it would represent the condition of affairs weekly with perfect accuracy.

While a few companies hold the prices firmly at $18 for No. 1 X, $17 for No. 2 X, and $16 for Gray Forge, best Lehigh brands, delivered at tide-water, there is a great deal of even good iron sold below these figures, and poor irons, and especially Southern irons, are offered at figures far below quotations, and in some instances far below the cost of manufacture.

We hear of Southern iron offered in Chicago at figures that, after deducting freights and charges, would net less than $10 a ton at the furnace. Though the cost of production at Southern furnaces will perhaps average at least $12 a ton, yet there are some at which the cost is below $10; but there is a good deal of truth in the recent remark of a Southern furnace superintendent: "I can make right along 100 tons a day of unsalable iron; but when I want to make an article the market will take, the furnace bungs up."

Scotch Pig.—There is the usual report. A few hundred tons arrived during the week, and prices in small lots of five to ten tons were about $21 for Coltness and other brands marked from that down to Eglinton at about $18. As we have pointed out, the foreign market has declined slowly but steadily, though a decline of a few pence there does not necessarily affect prices here. The fluctuations in freights greatly exceed those in foreign quotations.

Rolled Iron.—Large contracts have been made and others are in the market for beams, and other forms of building irons. These may be quoted as follows:

Angles, 2 @ 2·10c., delivered; Tees, 2 @ 2¼c.; Beams and Channels, 2·85@3c. for American iron; and Belgian and German Beams, 2½@2·60c.

Plates, 1·90c. for Tank iron; 2¼@2½c. for Boiler plate; Bar iron, 1·90@2c., ordinary sections.

Steel plates at 3c. for Ship plate; 3@3½c. Steel Boiler Shell, and 4c. for Flange plates.

Specification Bridge plates, open hearth steel, 2½c. per pound.

Steel Rails.—Though many of the mills are closed, the prices have not improved: $27 at Eastern mills is the standard quotation, but it is said that cash offers for round lots might not be refused at a shade below this.

Old Rails are quoted at $16@$17, according to quality and location.

Scrap is quoted nominally at $18@$18.50 from yard.

Philadelphia. June 11.

[From our Special Correspondent.]

The position of the iron trade in Eastern Pennsylvania this week is satisfactory to neither consuming nor producing interests. Buyers would rather see prices strengthen a little than weaken, although in making purchases they shop around a great deal and hammer prices down to the lowest cent. Not a single important transaction has been heard of in foundry irons. There are buyers here who have been considering the advisability of placing some heavy contracts for fall and winter delivery, but have not done so yet. The argument is made by furnace representatives that now is the time to buy, and some good reasons are given for the advice. Some very low prices have been named for good brands of Lehigh iron, and some makes of Schuylkill have been offered at very low figures. These efforts have not yet brought consumers to the point of doing business. The iron-makers in the East have been once more endeavoring to secure more satisfactory freight rates from the Reading people, but, as usual, they have declined to depart from their cast-iron policy of making the most the traffic can bear regardless whether that policy keeps five or fifty furnaces out of blast. About one half the furnaces in the Schuylkill valley are idle, and the argument is used that, if coal ore and pig-iron freight rates were more favorable, more of the idle capacity at least could be used, and more profitable traffic would be delivered for the transporting companies. There is much dissatisfaction among the manufacturing interests of Eastern Pennsylvania over prices of coal particularly. The decline has not been commensurate with the decline in other directions. They have no recourse, however, and must grin and bear. Forge iron is selling at from $14.50@$15.50, and only two or three companies are bold enough to say that they are well sold up. Perhaps two or three special brands are not to be had at short notice.

Foreign Iron.—Bessemer Pig is quoted at $18@$19—no sales. American Bessemer is selling well. Spiegeleisen is occasionally asked for, and small lots are sold at $25, or something under, for 20 per cent. Foreign slabs are occasionally asked for, but there have been no recent arrivals.

Muck-Bars.—Two or three mills are quite busy, and there is a prospect for a good deal of business between this and the end of June at about $26.50@$27.

Merchant Iron.—Every thing is in the same dragging condition. The scarcity in the West has not affected the East to any perceptible extent. The stores are perhaps selling a little more iron in a retail way. Refined is $1.70@$1.75; Common iron, $1.55 @$1.45. Two or three car-works have inquiries in the market. The iron interests here seem to expect a starting up in the West, and buyers are of the same mind, but they may be disappointed.

Nails.—There is no perceptible depletion of stocks, and prices are decidedly in favor of buyers. Of course, a great many nails are disposed of to builders, and during the past week more liberal distribution has been noticed, but the condition of the market is any thing but what makers would like. Mills are going in and unsettling the market here.

Plate Iron.—Small sales are made at 1·90@2c.

Bridge Iron.—The bridge-makers are still busy and picking up small orders every day, but there is no rush. Angles are 2c.; Tees, nominally 2·50c. Combination rates still hold.

Merchant Steel.—The mills have not reduced their output.

Steel Rails.—The steel rail makers of the State are all busy, and two of them are well sold up for early summer. A good many lots of light sections have sold at $32@$36. There are inquiries on hand for two or three large blocks. Some Western roads have concluded to make purchases in midsummer to complete some short lines and connections. Large blocks can be had at $26, and it is rumored at less; small lots, $27 @$27.50.

Old Rails.—There is a good deal of inquiry, but the business does not pan out well. Prices run all the way from $17@$18. Spot lots are promptly picked up.

Scrap.—Selected is selling at $18.50@$19; Steel Scrap, $19.50; Car-Wheels are held at $15.50.

Pittsburg, Pa. June 12.

Sales reported to Metal Exchange:

1000	tons	Gray Forge Lake ore	$15.50	4 mos.
200	"	" "	15.50	"
200	"	White ore	14.50	"
300	"	Gray Forge Native ore	14.50	"
50	"	Foundry No. 1 "	16.50	cash.
50	"	" No. 2	16.00	"

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 12.

Anthracite.

This market is dull, and nothing worthy of note has occurred.

We quote average selling prices of hard and free-burning coals as follows, f. o. b. New York shipping ports:

	Selling prices.	Circular rates.
Broken and Egg	$3.15@$3.35	$3.40@$3.65
Stove	3.65@ 3.85	4.00@ 5.00
Chestnut	3.10@ 3.40	3.65@ 4.00
Pea, soft	2.00@ 2.50	2.65@ 2.45
" hard	1.85@ 2.25	2.65@ 2.45

and a quiet business, according to some dealers, being extremely sluggish, and according to others fairly good. Nothing but dullness is expected for the next two months, and when no large orders are in the market, little attention is called to the cutting in prices. In small orders, our higher figures are sometimes obtained, and for inferior coals even our lowest are shaded.

The production of anthracite to the 6th of June was about half a million tons behind that of last year at same date. At the end of May, it was about a million tons behind. There is every probability that the year's production will fall 1¾ million tons below that of 1884, which was 30,718,293 gross tons. And as the Pennsylvania Railroad will probably mine nearly a million tons above its proportion, the decline that the others will have to submit to may amount to 2½ million tons.

The stoppage of so many anthracite furnaces is a serious loss to the anthracite trade, and it is a question that should receive the attention of the coal companies, and such a reduction should be made in prices as would enable the Eastern furnaces to hold their own in the present depressed condition of the trade.

Bituminous.

Nothing but a very light business is doing, and even companies that have large orders on their books are complaining that delivery is delayed by the declining consumption. As there are no large orders in the market to compete for, prices are kept as near the old $3.25 rate as possible.

A quotation for the small sales made of $3.10 @$3.15 for Clearfield and Cumberland, and $2.80@ $2.90 per ton for "Vanderbilt" coal, f. o. b. New York shipping ports, represents the condition of the market.

Our Buffalo correspondence gives the condition of the Western market, which is on its good behavior since the last proclamation from the "committee." For some weeks past, the soft coal men have been after the Michigan Central Railroad supply contract, which amounts to 100,000 tons. To-day, it was divided between J. Langdon & Co. and Bell, Lewis & Yates, the two Vanderbilt firms. They will not make public the price, but it is well known that it was below $1.80, the pool rate.

Philadelphia. June 11.

[From our Special Correspondent.]

The anthracite coal managers are doing remarkably well, considering the drawbacks and the competition and general dullness in manufacturing demand with which they have to contend. Prices are extremely low, but the wonder is, that they are not lower, and in fact, the wonder is, that a combination of any kind is possible under the circumstances. The managers find themselves in the middle of June in a very fair state as to stocks. There is no rule for production, and if buyers were to act with ordinary business prudence, the anthracite trade would be in a passable condition. A good deal of bituminous is pushed into Eastern markets, and supplies of this kind of fuel will grow larger, and probably give more trouble. Anthracite is holding its own wonderfully against soft coal. The companies are quietly extending their markets, and are able to meet competition on the smaller sizes in the East. A good deal of business would be done at this time but for the feeling entertained among consumers that the bottom has not been reached. Nearly all are buying only what they need, but are tempted to make extensive purchases by occasional offers. The local demand is light. Throughout Eastern Pennsylvania the manufacturers are not carrying any stocks. The iron interests have endeavored to obtain more favorable freight rates from the Philadelphia & Reading Company. No large bituminous coal contracts have been placed for a week; in fact, the greater bulk of the business is over, and the smaller concerns are picking up the sweepings.

Buffalo. June 11.

[From our Special Correspondent.]

The daily attendance at the Merchants' Exchange of persons interested in the coal trade is large, and apparently the best of feeling prevails. There is no particularly startling news to report. The following paragraphs summarize the points of importance.

The bituminous coal is trade nominally unchanged; prices as a rule are sustained. The Hamilton Coal Company's office is to rent, and the report in circulation is, that the mines have been sold to Messrs. Powers, Brown & Co., backed by a syndicate in which the Grand Trunk Railroad of Canada is interested.

The members of the Western Anthracite Coal Association will meet at the Merchants' Exchange here to-morrow. A delegation from the Chicago Coal Exchange is expected to arrive this afternoon to consult relative to fixing a schedule of prices that shall be satisfactory to all concerned.

The dealers here have thus far adhered to the scale of prices recommended at the meeting reported in your

columns last week. Stringent measures will be adopted against those who may break the agreement. "No coal" to any one found guilty of a breach of comity. Therefore the "Exchange" may prove a blessing to its members.

Last Monday, the agents representing the Lehigh Valley, Delaware & Hudson, Delaware, Lackawanna & Western, and the Butler Colliery companies, also J. Langdon & Co. and Frank H. Goodyear, met to fix the rate that the city must pay for anthracite coal for the Police Department, and it was decided that $4.25 a ton should be charged for furnace and $4.60 for egg and stove sizes.

The bids opened by the Buffalo Water-Works Commissioners, referred to in last week's ENGINEERING AND MINING JOURNAL, were all rejected for the reason that they desired the same quality of coal as that furnished in 1884 by Messrs. Albright & Smith, the agents of the Philadelphia & Reading Company of this city. The commissioners accordingly entered into a contract with the firm named for supplying all the grate coal required for twelve months at $3.60 a ton, delivered in the bins at the water-works. The contract price last year was $3.75 a ton. Mr. H. C. Springer, the lowest bidder ($3.50), considers the action of the Board unjust.

The coal shipments by lake from Buffalo June 4th to 10th, both days inclusive, were: 20,730 tons to Chicago, 21,710 to Milwaukee, 3150 to Duluth, 1800 to Washburn, 6070 to Toledo, and 1230 to Sandusky. Lake freights on coal hence to Chicago and Milwaukee closed last week nominally at 70 cents a net ton. On Monday, the struggle between the carriers and shippers was renewed. An agreement was entered into by nearly all the shippers for the purpose of regulating prices, and Mr. Ball, of the Delaware, Lackawanna & Western, was given charge of the matter for one week; all shipping to be done through him and the carriers. It is claimed that by this method vessel agents can not so readily force an advance of rates as was the case before, and that shippers will receive a more even distribution of tonnage. There is a strong feeling among coal men that the present lake rates to Chicago and Milwaukee are too high; that the railroads are nearly as cheap carriers, taking all minor details into consideration; and that from 40 to 45 cents a ton is all that the coal can afford at present quotations at the mines and in the unsettled and demoralized condition of the Western markets. On Monday, two vessels were chartered to Milwaukee at 70c., and several at 65c. to Chicago and Milwaukee. Since Monday, charters have been made at 65c., and closed to-day at 65c. to Chicago and 60c. to Milwaukee; tonnage scarce and the stock of coal on the docks fairly plentiful. The freight figures for the week ended this forenoon were 70@65c. to Chicago, 70@65@60c. to Milwaukee, 25c. to Toledo and Sandusky, and 40c. to Duluth and Washburn.

The shipments of coal by canal for the week include 3 boat-loads to Syracuse at 60c. per gross ton, captain to pay unloading only; 1 boat-load to New York, $1.20 net, captain to pay loading and unloading; and 2 boat-loads to Hartford, Conn., at $2 net, captain to pay loading and unloading; nominally asking 90c. net to Albany, captain to pay loading and unloading.

The receipts of coal at Duluth, Minn., for the week ended June 6th were 27,600 tons. Active preparations are still carried on at the breakwater at Port Arthur; the cribs are building preparatory to sinking into position. The St. Paul & Pacific Coal and Iron Company at Superior City is having trouble with its laborers, who are on strike for higher wages. Only two vessels a day have been handled, and ten or a dozen are awaiting unloading. Some captains have made claims for demurrage. The Ohio Central Company at Duluth received 15,000 tons of coal last week, which should have been unloaded at Superior City.

Boston. June 10.

[From our Special Correspondent.]

Affairs in the anthracite branch seem to be in a somewhat peculiar condition. The wholesale market is undoubtedly weak at New York and Philadelphia, but at the same time not much coal is pushed along. There has been a good demand at this port for cargoes afloat, and there seems to be no large amount available for immediate shipment. Retailers here are not well supplied by any means, and are showing more disposition to stock up.

May has been very quiet. The total receipts of domestic coal at this port were only 187,580 tons, or a decrease of 35,457, as compared with May, 1884. The total receipts since January 1st are only 3291 tons ahead of last year, but no one supposes that the relative consumption has not been very much larger than this would indicate, owing to our severe and long winter. This will have to be made up in the months to come, if dealers are to carry fairly large stocks. As before noted, it looks as though reasonable adherence to the allotment plan would keep the market steady. The hand-to-mouth system of buying reflects the feeling of uncertainty in minds of buyers.

June brought new circulars, with a solitary change of 25 cents advance in Lykens Valley egg, bringing that size up to $5.40, which is the price of stove.

Pocket prices have been advanced 10 cents on hard white broken and egg, making those sizes $4.50. Stove size is selling at $5.15. Lykens Valley egg has also been advanced 25 cents, to correspond with the change in circular. There is but little demand at the pockets at this time.

We note no important change in bituminous coal. New methods of getting around the pool are continually coming out. We hear of sales at regular pool price of $2.25@$2.35 f. o. b. at Baltimore and Philadelphia, but at the same time a freight is guaranteed that will make the delivered price as low as the case may demand. But the question is, Will the railroads let such shippers out? It is by no means settled yet that the railroads are making such rebates from the pool price as would be demanded to let the low bidders out whole on their contracts. We shall know more about this matter soon; meantime, those who have disregarded the pool may not yet be out of the woods. Small contracts are placed, but no business of note is transpiring. Culm of coal is already at $2.30, delivered. Low delivered prices of $4.10@$4.15 continue to be quoted for gas-coal.

There is a firm feeling in freights, at last week's quotations, with no change looked for in the near future. A few barges have come to Boston. We quote:

New York, 85@95c.; Philadelphia, $1.10@$1.15; Baltimore, $1.20@$1.25; Newport News, $1.15@$1.20; Richmond, $1.20@$1.25; Cape Breton, $1.50@$1.75.

There is very little retail trade stirring. Lately awarded contracts have gone at low figures, noting 4000 tons broken, to be delivered the year through at a figure below $4.65 delivered. Small lots are nominally unchanged in price, quoting net ton delivered as follows:

White ash, furnace and egg	$4.75@$5.00
" " stove and nut	5.25@ 5.50
Shamokin, egg	6.00
" stove	6.25
Lorberry, egg and stove	6.50@ 7.00
Franklin, egg and stove	7.25@ 7.75
Lehigh, furnace, egg, and stove	5.25@ 5.50
" nut	5.50@ 5.75

We quote wharf prices as follows: Stove, $4.75; Broken and Egg, $4@$4.50.

STATISTICS OF COAL PRODUCTION.

Production Bituminous Coal for week ended June 6th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1885. Week.	1885. Year.	1884. Week.	1884. Year.
Philadelphia & Erie RR	96	14,216	.....	.....
*Cumberland Region, Md	55,284	1,117,274	74,811	1,102,325
*Barclay Region, Pa.				
Barclay RR	3,567	106,565	4,614	148,558
*Broad Top Region, Pa.				
Huntington & Broad Top RR	2,240	75,596	3,343	84,580
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe	1,763	76,777	2,691	83,057
Karthaus (Keating)	2,712	59,513	989	8,196
Tyrone & Clearfield	67,020	1,340,088	63,633	1,324,769
Alleghany Region, Pa.				
Gallitzin & Mountain	9,827	219,762	8,948	163,616
Total	142,449	3,009,791	159,029	2,915,101

WESTERN SHIPMENTS.†

Pittsburg Region, Pa.				
West Penn RR	2,996	118,354	5,410	126,828
SouthwestPenn.RR.	1,437	46,556	1,881	70,716
Pennsylvania RR	3,537	82,143	6,380	125,968
Westmoreland Region, Pa.				
Pennsylvania RR	39,405	430,836	30,767	516,148
Monongahela Region, Pa.				
Pennsylvania RR	4,936	88,828	2,614	68,103
Total	52,311	766,721	47,052	907,763
Grand total	194,760	3,776,512	206,081	3,822,864

* Tons of 2240 lbs.

† Considerable gas-coal shipped East, of which no division is made in report.

Production Anthracite Coal for week ended June 6th, and year from January 1st:

TONS OF 2240 LBS.	1885. Week.	1885. Year.	1884. Week.	1884. Year.
P. & Read. RR. Co.	225,355	4,113,998	381	4,112,764
L. V. RR. Co.	119,651	2,030,178	.....	2,260,638
D., L. & W. RR. Co.	90,305	1,610,467	27,629	1,913,785
D. & H. Canal Co.	75,727	1,372,918	.....	1,404,442
Penna. RR.:				
N. & West Br. RR.	25,577	489,326	18,653	344,837
S. H. & W. B. RR.	7,002	84,171	4,798	87,880
P. & N. Y. RR.	6,341	148,644	.....	210,063
Penna. Coal Co.	31,703	500,742	11,022	463,033
Penna. Canal Co.	12,931	81,473	11,088	107,039
Shamokin Div., N. C. RR	13,099	382,788	12,088	401,924
Lykens Valley	†10,000	206,752	11,236	242,100
Total	617,691	11,021,457	96,895	11,528,445
Increase	.....	.....	.....	.....
Decrease	520,796	506,988	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1880	9,104,316	1882	10,593,301
1881	10,593,301	1883	12,102,090

† Estimated.

Production of Coke on line of Pennsylvania RR. for week ended June 6th, and year from January 1st:

Tons of 2000 pounds.

	1885. Week	1885. Year.	1884. Week.	1884. Year.
Alleghany Region.	3,982	80,521	*	55,254
West Penn. RR.	1,573	17,525	*	24,504
Southwest Penn. RR	34,996	824,611	*	930,625
Penn. & W. Region	4,595	101,245	*	74,485
Monongahela	1,872	39,894	*	34,187
Pittsburg Region.	.....	.....	*	136
Snow Shoe	135	6,422	*	8,732
Total	47,153	1,070,218	*	1,127,923
Increase	.....	.....	.....	.....
Decrease	.....	.....	.....	.....

* Reports for week ended June 7th, 1884, were not published, and hence we can not give the exact figures of increase and decrease.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, June 12.

The outlook in the mining market is more favorable. The business shows a large increase of sales, and prices continue to show an upward tendency.

The advance in prices and sales of the Bodie group has attracted considerable attention. The cause of this advance is not known, the reports from the mines showing nothing of importance. Bodie Consolidated advanced from $1.60@$2.35, closing at $2.25; the sales were 2040 shares. Bulwer Consolidated has been active, ranging from 45@59c., closing at 52c.; transactions, 3230 shares. Standard Consolidated ruled at from $1.25@$1.60, with sales of 2900 shares. The first shipment of bullion since the starting of the mill, June 1st, will be made on Monday. Consolidated Pacific has been quiet at from 35@39c., 2100 shares changing hands. Gold Stope sold at from 9@10c. Plymouth Consolidated shows a small business of 520 shares at from $17.25@$17.38 ex dividend.

The announcement of a $100,000 dividend by the Iron Silver Mining Company has not affected the price of the stock, which shows only the small business of 300 shares at $1.35. The mine is said to be looking very well throughout, and the management expects to make $200,000 net before the end of the year, in addition to the dividend just declared. This mine is keeping up its splendid record, and is one of "the great mines of the West." Robinson Consolidated continues firm at from 53@68c., with sales of 1000 shares. Little Pittsburg sold at from 40@30c. Little Chief, 30@26c. Leadville, 40c. Chrysolite, 90c. Amie, 3c. Lacrosse, from 9@10c. Breece, from 12@13c. Bassick shows a downward tendency, which is no doubt due to the difficulties at the mine. Further information on this subject will be found in another column. Two hundred shares were sold at from $1.40@$1.10. Colorado Central, firm at from $1.40@$1.45.

The activity in Consolidated California & Virginia continues; it opened at $3.75, was quoted on Tuesday at $2.90, and closed at $3; the sales amounted to 6070 shares. Sutro Tunnel was quiet at from 17@19c., some 37,677 shares changing hands. Sierra Nevada has been higher, at from $1.45@$2.55. Union Consolidated sold at from $1.50@$2, closing at $1.75. Alta advanced from 50@90c. Savage sold at $4. Ophir, at from $2.50@$2.25.

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 6. H.	June 6. L.	June 8. H.	June 8. L.	June 9. H.	June 9. L.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	SALES.
Alice, Mon.											2.00		100
Annie Con., Co.					.03								500
Argenta			.12		.20	.19	.20						1,700
Bassick, Co.									1.40		1.10		200
Belle Isle, Ne.	.25												100
Bodie Cons., Ca.	1.60		1.60		1.85	1.75	2.25	1.90	2 35	2.20	2.25		2,040
Breece, Co.					.12		.13	.12					2,200
Bulwer, Ca.	.45		.48		.49		.56	.47	.59	.56	.52		3,230
California, Ne.													
Cal. & Hecla, Mich.													
Castle Creek													
Chollar													
Chrysolite, Co.									.90				100
Colorado Central					1.45	1.40							200
Cons. Cal. & Va., Ne.	3.75	3.50			3.00	2.90	3.20	3 00	3.25	3.10	3.05	3.00	6,070
Crown Point													
Dunkin, Co.													
Eureka Cons., Ne.									8.00				45
Father de Smet, Dk.	3.00		3.00		3.00		3.25						370
Findley, Ga.													
Gold Stripe, Ca.			.09		.09		.10						5,500
Gould & Curry, Ne.													
Grand Prize, Ne.	.51				.85				.60				900
Green Mountain, Ca.													
Hale & Norcross, Ne.													
Hall-Anderson, N. S.													
Homestake, Dk.	14.13										14.00		150
Horn-Silver, Ut.	1.95		1.90		2 00	1.95	2.00						2,280
Independence, Ne.													
Iron Silver, Co.			1.35						1.35				300
Leadville C., Co.			.40										100
Little Chief, Co.	.30	.28									.26		600
Little Pittsburg, Co.	.40						.30						1,000
Martin White, Ne.													
Moulton					1.35								200
Navajo, Ne.							.80						300
North Belle Isle, Ne.													
Ontario, Ut.	25.00												200
Ophir					2.50	2.25							700
Plymouth	17.25		17.25		17.25		17.38	17.25			17.38		520
Potosi													
Quicksilver Pref., Ca.													
" Com., Ca.													
Robinson Cons., Co.	.56	.53							.68	.65	.65	.61	1,000
Savage, Ne.					4.00								400
Sierra Nevada, Ne.			1.45		1.75	1.70	2.25						610
Silver King, Ar.											4.00	3.95	110
Spring Valley, Ca.													
Standard, Ca.	1.50	1.25			1.45				1.55	1.50	1 60	1.55	2,900
Stormont, Ut.					.15				11				600
Tip Top, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 6. H.	June 6. L.	June 8. H.	June 8. L.	June 9. H.	June 9. L.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	SALES.
Albion	.65	.60	.65	.60	.55	.50	.75		.90		.75		1,700
Alta									.04				600
American Flag	.07												200
Barcelona, s.													
Bechtel Con., s.													
Belvidere													
Belcher													
Best & B'cher, s.													
Big Pittsburg, s. l.													
Bradshaw, s.													
Bull-Domingo, s.l.													
Cal., B. H., s.									.60				500
Central Ariz'na, s.			.20		.18		.20						1,100
Climax, Co.													
Cons. Imperial													
Con. Pacific	.39		.39	.38	.36	.35	.38		.37		.38		2,100
Dahlonega													
Decatur													
Durango, s.													
Eastern Oregon													
Goodshaw, s.													
Harlem M. & M. Co.													
Hortense, s.													
Kossuth	.08				.08		.06		.04				2,200
Lacrosse, s.	.10		.09						.10	.09			1,400
Mariposa Pref., s.													
" Com., s.													
Mexican, s. s.									1 95				100
Mono													
New Pittsburg													
Noonday													
North Standard, s.													
N. Horn-Silv'r, s. l.													
Ori'nt'l & Miller, s	.14	.12			.12		.14	.13	.15	.14			9,600
Rappahannock, s	.07		.07		.09				.07				4,200
Red Elephant, s.													
Ruby, of Arizona													
Silver Cliff, s.													
Sonora Con.													
South Bodie, s.													
South Bulwer, s.													
South Hite													
South Pacific													
State Line, 1 & 4, s.													
" Nos. 2 & 3, s.													
Sutro Tunnel	.19	.18	.19	.18	.19	.17	.19	.18	.18		.18	.17	37,677
Taylor Plumas													
Tioga													
Unadilla, s													
Union Cons., s. s.							1.65	1.50	2.00	1.95			1,450
Utah											1.75		

Dividend shares sold, 35,225. Non-dividend shares sold, 62,827.

The Tuscarora stocks have been quiet. Navajo sold at 80c. Grand Prize, at from 51@85c. Belle Isle, at 25c. Eureka Consolidated, 45 shares at $8.

There are no reports from the Horn-Silver mine; the price has been steady at from $1.90@$2, with sales of 2280 shares. Ontario recorded a sale of 200 shares at $25. Stormont, 600 shares at from 15@11c.

Homestake holds its own at from $14@$14.13. Father de Smet, at from $3@$3.25. Silver King has been higher, at from $3.95@$4. Moulton, $1.35.

The transactions during the week show an increase of 30,263 shares, as compared with those of the previous week; the total transactions being 98,052 shares. A complete summary of the market will be found elsewhere.

The Consolidated Stock and Petroleum Exchange held its annual meeting June 9th. The president said, in reviewing the business of the Exchange for its ninth year, that the institution had been particularly prosperous. Beginning the year with a membership of 1369, the Exchange now has 2177, and the cash surplus has increased from $204,404 to $325,098, and the current expenses of the Exchange are well within its yearly income. The experiment of the Exchange in adding dealings in railroad stocks to its business was declared to be a success.

It has been determined to open the Exchange at eleven o'clock on Monday mornings up to October 1st. The Exchange will close to-day at half-past twelve, in order to allow time for repairs and to see the effect of the early closing, with the view of determining the advisability of early Saturday closing in the future.

The following securities were sold at auction June 10th:

3 shares Chesapeake & Ohio 1st preferred stock, $100 each, 6; 1000 shares of the Buckeye Mining Company, $5 each, 4; 250 shares of Hukill Mining Company stock, $5 each, 2; 500 shares of Gold Stripe Mining Company stock, $10 each, 40; $40,000 1st mortgage bonds of the Selma, Rome & Dalton Railroad Company, 80; $90,000 2d mortgage bonds of the Selma, Rome & Dalton Railroad Company, 90; $40,000 2d mortgage bonds of the Selma, Rome & Dalton Railroad Company, 35; $1000 1st mortgage bonds of the Rising Sun Gold Mining Company—2 of $500 each, 26; 1000 shares of Van De Water Mining Company stock, $10 each, 8; 133⅓ shares of New Pittsburg Mining Company stock, $10 each, 55; 366¾ shares of New Pittsburg Mining Company stock, $10 each, 55; 1200 shares of Columbia & Beaver Silver Mining Company, $1 each, 12; 100 shares of Central Arizona Mining Company, $10 each, 18; 100 shares of Little Chief Mining Company, $50 each, 27; 1500 shares of South Pacific Mining Company, $1 each, 6; $90,000 2d mortgage bonds of the Selma, Rome & Dalton Railroad Company, 70; $10,000 1st mortgage bonds of the Selma, Rome & Dalton Railroad Company, 41; 300 shares of the Sutro Tunnel Company, $10 each, 18½ each; 1000 shares of Lubec Silver Mining Company, of Maine, $10 each, 5½; 2200 shares of the Van De Water Mining Company, $10 each, 11; 1000 shares of the Granville Gold Mining Company, $1 each, 2.

Coal Stocks.

The stock market was very quiet and depressed until yesterday, when a general reaction set in, followed by larger business and higher prices to-day. The Agricultural Department estimates the crop of wheat at 360,000,000 bushels, and Minneapolis millers at 330,000,000 bushels. This is very discouraging.

The decline in Pennsylvania Railroad continues. The price opened at $48¼, and closed at $47½. The sales have been smaller, amounting to only 14,899 shares The Philadelphia & Reading Railroad remains firm at from $13@$13¾. The highest price reached last week was $13¼. Lehigh Coal and Navigation Company has been steady at from $41@$40⅝. Lehigh Valley has been higher, opening at $57¾ and closing at $58⅛. On Thursday, it sold as high as $58⅝. Delaware & Lackawanna has been a prominent feature of the market, the sales amounting to 160,680 shares, the price ranging from $99⅝ to $102¾. Delaware & Hudson has been higher, as compared with the preceding week. The prices then were $76⅛@$77⅝. This week, they were quoted at from $77@$78¾. Jersey Central, which opened at $36⅛, declined to $35⅛ during the week. The closing quotations show, however, higher figures, the price ranging from $37¼@$36⅝. The directors' meeting, called for to-day at the request of the Baltimore & Ohio, to further consider the proposed traffic arrangement, has been indefinitely postponed. The Baltimore & Ohio people meet the Philadelphia City Council to-day in regard to right of way through the city. Morris & Essex shows sales of 394 shares, at from $124@$125.

Dividends.

Father de Smet Consolidated Mining Company, of Dakota, has declared a dividend of twenty cents a share, payable at Laidlaw & Co.'s, No. 14 Wall street, June 30th.

Iron Silver Mining Company, of Colorado, has declared a dividend of twenty cents a share, or $100,000, payable July 1st.

Pueblo Smelting and Refining Company, of Colorado, quarterly, 2½ per cent, payable July 1st.

St. Joseph Lead Company, of Missouri, has declared a dividend of twenty cents a share, payable June 20th.

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount
Alta, Nev.	32	April 30	June 4	June 24	.25
Baker Divide, Cal.	9	May 12	June 15	July 6	.25
Belmont, Nev.	39	Feb. 11	*May 7	*June 1	.15
Best & Belcher, Nev.	32	June 2	July 7	July 28	.50
Bowman Silver, Nev.				June	.05
Buchanan, Cal.	12	April 14	May 18	June 5	.15
Caledonia, Nev.	40	April 13	May 16	June 5	.10
Caledonia, Dak	16	May 28	July 10	Aug. 5	.15
Champion, Cal.	19	April 23	June 1	June 19	.08
Chollar, Nev.	16	May 18	June 24	July 15	.50
Cons. Imperial, Nev.	22	May 10	June 23	July 15	.10
Daisy Cement, Cal.	4	April 4	May 12	June 3	.02
Eintracht Gravel, Cal	18	May 26	June 30	July 18	.05
Golden Fleece, Cal.	1	April 18	*June 8	*June 27	$20
Gould & Curry, Nev.	50	June 1	July 8	July 29	.40
Hale & Norcross, Nev.	85	May 6	June 9	June 29	.50
Hanover, Mich.		April	April 19	June 1	.10
Iowa, Nev.	17	April 29	June 6	June 27	.05
Julia Cons., Nev.	20	April 6	May 13	June 5	.10
Loreto, Mex	8	April 28	May 29	June 2	.15
Navajo, Nev	11	May 25	June 29	July 20	.25
New Basil Cons., Cal.	7	April 23	June	June 27	.05
Overman, Nev.	55	April 20	May 23	June 12	.20
Peerless, Ariz.	4	May 18	June 23	July 17	.30
Pinal Cons., Ariz.	6	April 10	May 18	June 8	.06
Potosi, Nev	18	May 13	June 19	July 10	.30
Ruby Hill, Nev	8	April 4	May 5	June 5	.01
Santa Anita, Cal	8	April 23	May 26	June 16	.02
Sierra Nevada, Nev.		June			.25
St. Lawrence, Nev.	2	May 5	July 1	July 20	.50
Sulphur Bank, Cal.	3	Feb. 25	April 16	June 1	.50
Union Cons., Nev.	30	April 16	May 20	June 9	.25
Wallis Cons., Cal.	2	May 2	June 7	July 13	

* Had been delinquent. Earlier date postponed until time mentioned.

Meetings.

Coalburg Land and Mining Company, No. 69 Wall street, Room 56, New York City, June 22d, from three to four o'clock P.M., annual meeting.

Taylor Iron Company, Room No. 1, Merchants'

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share. June 6. H.	June 6. L.	June 8. H.	June 8. L.	June 9. H.	June 9. L.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	Sales from June 6th to June 12th inclusive.
Barclay Coal														
Cameron Coal	50													
Col., C & I	10	10	9¾							10⅛				1,000
Ches. & O. RR	100													
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100	77¼	77⅛	77⅝	77	77¼	77	77⅝	77¼	78⅜	77¾	78¾	77¾	4,813
D., L. & W. RR	50	100⅝	100	101⅞	99⅝	101	100⅛	101½	100¼	102¼	101¼	102¾	102⅛	160,680
Elk Lick Coal Co														
Lehigh C. & N.†	50	41	40¾	40⅞	40¾	40¾	40⅝	40⅞	40¾	40⅞				1,480
Lehigh Valley RR.†	50	57¾		58	57¾	58		58⅛	58	58⅝	58⅛			568
L. & W. C. & I Co														
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50			124½		125	124	125						394
New Central Coal	100													
N. J. C. RR	100	36⅛	36	36⅛	35⅞	36¾	35⅞	37⅛	36⅜	37⅜	36⅞	37¼	36⅝	16,582
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR †	50	48¼	48	48	47¾	47⅞	47¾	47⅝	47½	47¾	47½			14,899
Ph. & R. RR.*	50			13		13		13½				13¾	13¼	3,143
Spring Mountain	50													
Westmoreland Coal.†	50													

* Of the sales of this stock, 1583 shares were in Philadelphia and 1560 in New York. Total sales, 203,559.
† The quotations for these stocks are not percentage, but actual price.

Bank Building, Cleveland, Ohio, June 30th, at eleven o'clock A.M., for the purpose of taking action upon the question of surrendering the company lease and disposing of the personal property of the company.

Pipe Line Certificates.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

June	Opening.	Highest.	Lowest.	Closing.	Sales.
6...	$0.78¾	$0.79⅝	$0.78¾	$0.79⅛	2,902,000
8...	.79¼	.79⅛	.78⅞	.79⅛	2,798,000
9...	.79⅛	.80¼	.79⅛	.79¼	3,883,000
10...	.79⅝	.80	.79¼	.79¼	3,509,000
11...	.79¼	.80	.79⅛	.79⅝	3,512,000
12...	.79¾	.80	.79½	.79⅝	3,217,000
Total sales					19,821,000

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, June 11.

The market for copper stocks has been strong, but not very active, the past week, the principal dealings being in Calumet & Hecla and Quincy. The former, under the large output of the mine for May (about 2550 tons) and the firmness of ingot copper, together with the announced dividend of $7 a share, rapidly advanced from $175@$182, and sold, dividend off, on the 8th instant, at $175¾, with a subsequent decline to $173; the total number of shares sold for the week being 71. The product of the mine for the five months of the present year is reported as 11,720 tons, against 10,830 tons last year for the same months, showing a gain of about 890 tons, and is the largest recorded output in its history. Quincy continues to rule firm at $35@$35½, with a good demand for the stock and but little offered for sale. Sales for the week, only 150 shares. The May product was 250 tons, which is a slight falling off from last year. Franklin sold at $8 (200 shares), same as last week. This company, as has been predicted, announced yesterday a dividend of $1 a share, payable July 1st, to stockholders of record on the 20th inst. After paying this dividend, there will be a handsome surplus remaining, which, with the prospect for the coming season, will no doubt enable the company to pay another dividend before the year closes. The stock is very cheap at present prices, and will undoubtedly go much higher in the near future. Atlantic, from some unexplained reason, declined from $7½@$6½ on sales of 200 shares. The output of this mine for May was 215½ tons, an increase of 24 tons over last year, and the stock ought to sell at much higher figures. Allouez advanced $⅛, with sales of 250 shares at 50c. a share, and is booked for higher prices. These comprise all the dealings in copper stocks at the regular Stock Exchange for the week, and aggregate only 871 shares, showing the extreme dullness prevailing in mining circles.

At the Boston Mining Exchange, the dealings in copper stocks are very limited. Occasional sales are reported at about the regular board prices. In silver stocks, Bowman is fairly active at 12@13c., assessment paid. Dunkin, at 19@20c. Catalpa, 22@25c. Consolidated Pacific, 30c. bid, 40 asked. "Cusi," $1.25 @$1.35. In miscellaneous stocks, there is but little doing. The water-meters are steady at 18@20c. for both New England and Standard. Brunswick Berth, 19@23c. American Electric and Illuminating Company is virtually out of the market, the stock having been exchanged for that of the new company.

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. June 5.	June 6.	June 8.	June 9.	June 10.	June 11.
Albion						
Alpha						
Alta	.55	.60	.65	.80	.90	.75
Argenta						
Bechtel						
Belcher		1.00	1.12½	1.25	1.37½	1.50
Belle Isle						
Best & Belcher	3.75	3.87½	3.75	3.87½	3.75	3.50
Bodie	1.50	1.50	1.62½	1.75	2.00	2.12½
Bullion						
Bulwer						
Challar	2.25	2.25	2.50	2.62½	2.62½	2.12½
Con. Pacific						
Con. Cal. & Va.	3.37½	3.62½	2.87½	3.25	3.37½	3.25
Crown Point	1.37½	1.37½	1.50	1.50	1.75	1.75
Day						
Elko Cons						
Eureka Cons	8.00			7.87½	7.25	8.00
Exchequer						
Gould & Curry	2.12½	2.25	2.25	2.37½	2.37½	2.12½
Grand Prize						
Hale & Norcross	6.75	7 62½	7.50	7.87½	8.25	7.50
Independence						
Martin White						
Mexican	1.25	1.50	1.50	1.75	1.75	1.50
Mono						
Mount Diablo	3.75			3.75		
Navajo	.90	.90	.85	.85	.90	.95
Northern Belle						
North Belle Isle						
Ophir	1.87½	2.25	2 25	2.37½	2.25	2.12½
Overman						
Potosi	.75	.85	.95	1.00	1.00	.90
Savage	3.87½	4.00	4.12½	4.25	4.75	4.50
Scorpion						
Sierra Nevada	1.37½	1.50	1.75	2.12½	2.00	1.75
Silver King						
Tip-Top						
Union Cons	1.37½	1.50	1.50	2.00	2.00	1.62½
Utah		2.12½	2.00	2.75	3.12½	2.75
Wales Cons						
Yellow Jacket	2.62½	2.75	2.75	2.75	3.12½	3 00

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Albany			
Baltimore	.58§		
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Beverly	1.10@1.15		.90
Boston, Mass	1.10@1.15	1.15@1.35	.90
Bristol	1.10	1.15	
Bridgeport, Conn.		1.00@1.05	.50
Brooklyn		1 05	
Buffalo, N. Y			
Cambridge, Mass.	1.10@1.15		.90
Cambridgeport	1.10@1.15		.90
Charleston, S. C.	.70	.70@.80	
Charlestown	1.15		.90
Chelsea	1.10		.90
City Point			
Com. Pt., Mass.	1.20		.90
E. Boston	1.10		.90
East Cambridge	1.15		
E.Gr'nwich, R. I.			
Fall River	1.00		.70
Galveston		2.60	
Gardiner, Me	1 25	1.30	
Georgetown, D.C.	.65@.70		
Gloucester	1.15@1.20		
Halifax			
Hartford			
Hackensack			
Hudson			
Lynn	1.20@1.30		
Marblehead	1.20@1.25		
Medford			
Millville, N. J			
Milton			
Newark, N. J		1.15	
New Bedford	1.00@1.05	1.10	.75
Newburyport		1.35	
New Haven		1.05	.50
New London		1.10	.70
New Orleans			
New-Berne			
Newport	1.10		.70
New York		1.00@1.10	
Norfolk, Va	.55		
Norwich			.75
Norwalk, Conn			
Pawtucket			
Philadelphia			
Portland, Me	.75@.80*	1.20	.90
Portsmouth, Va.	.55		
Portsmouth, N.H.		1.30	1.00
Providence	1.00	1.10	.70
Quincy Point	1.20‖		
Richmond, Va	.60@.65		
Rockland, Me			
Rockport	1.40		
Roxbury, Mass.	1.10‡		
Saco			
Sag Harbor			
Salem, Mass.	1.15@1.25		.95
Saugus			
Savannah		.80@1.00	
Somerset	1.00	1.15	
Staten Island		1.00	
Trenton			
Troy			
Wareham			
Washington	.65@.70		
Weymouth			
Williamsbg, N.Y.		1.05	
Wilmington, Del.			
Wilmington, N.C.	.70	.90	
St. Thomas, W. I.			
Key West, Fla.			

* And discharging. † And discharging and towing. ‡ 3c. Per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. ** Below bridge.

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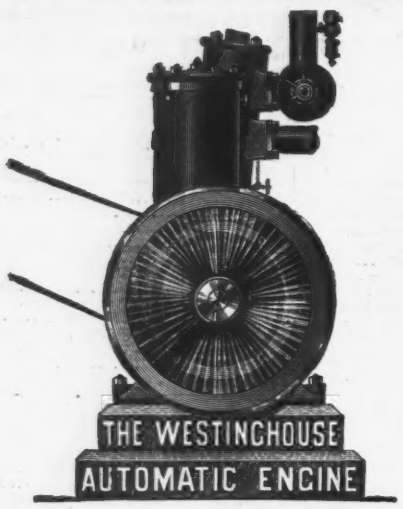

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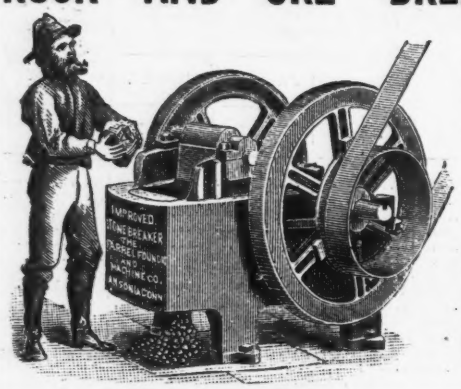

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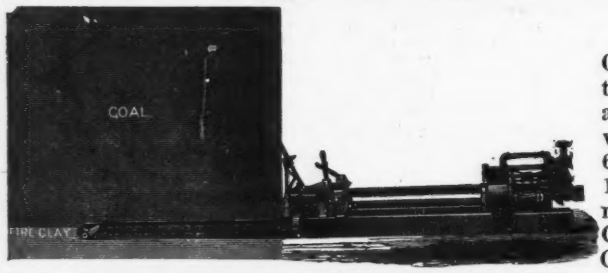

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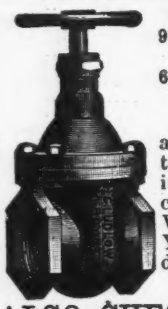

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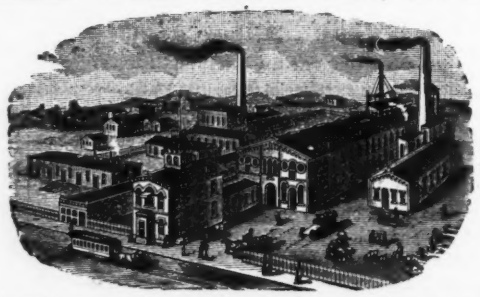

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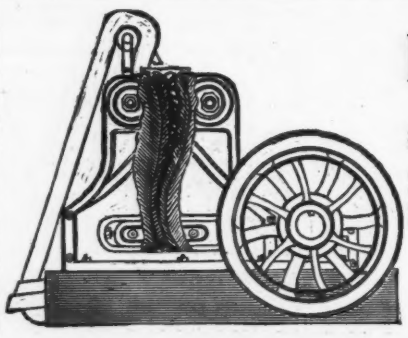

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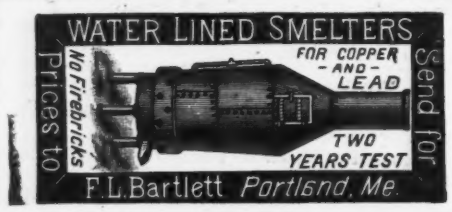

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